

# THE IRON AGE

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## Successful Safety Week at Ford Plant



**The Making of 30,972 Cars by 46,627 Workers Without a Major Accident and With a 50 Per Cent Reduction in Minor Accidents**

**A** WEEK of intensive safety work among the 46,627 workers at the Highland Park plant, Detroit, of the Ford Motor Co. produced astonishing results, according to figures obtained from the department of safety and factory hygiene of the company. During this period 30,972 cars were manufactured, in conjunction with the various branches; 1253 carloads, or 31 trains of 40 cars each, were loaded with finished parts and shipped over the entire country, and a proportionate number of railroad cars filled with raw materials entered the plant. This was all accomplished without a major accident, and minor accidents were reduced 50 per cent.

There were no fatal accidents; no amputations of fingers, toes, etc., and no eyes lost. Four accidents involved the loss of one day each; three, two days each; two, four days each; one, five days; two, six days each; four, seven days each; one, ten days, and one, 14 days. A total of 18 cases and 87 days lost time. Only two cases entered the compensation period which starts after the seventh day. These were foot accidents, caused by dropping material.

Employees worked a total of approximately 276,000 days. The days lost through accidents amounted to 87. According to the scale of time losses advocated by the U. S. Bureau of Labor Statistics, this would give a frequency rate of 8.15 lost time accidents per one million hours worked; and a severity rate of 0.32 lost hours per one thousand hours worked.

Every employee was instructed in the safe operation of his particular job at group meetings conducted by superintendents and foremen during the lunch periods on all shifts. The reproduced photographs show a few of these meetings in progress:

The picture at the bottom of page 130 was taken on the roof of a six-story building. The men are almost continually engaged in hazardous work on scaffolds, etc. Those in the upper left hand corner have just recently completed the painting of the large smoke stacks shown in the rear of the picture. This factory paint department went 46 consecutive months without a lost time accident.

Another picture shows a meeting in progress in the drop forge department, where axles, connecting



Lunch Hour Talk in the Drop Forge Department for Which Improvised Seats Were Obtained

rods, etc., are formed under steam hammers. The large upsetting machines shown press hot metal into gear blanks and other automobile parts. The

the body pressed steel department. This department employs 2767 men, who make more than 350 different parts for the Ford car. Four hundred punch presses and 950 other machines are used in this work. The punch press is considered one of the most dangerous machines in industry. During the week 78 carloads of steel were made into fenders,

Form 2879

### To All New Employees

**GREETINGS:** We want your stay with us to be long, prosperous and free from injury. Whether or not it will be so is partly up to YOU. Are you careful? Are you ambitious? Work safely so we all can enjoy Safety.

When injured so that BLOOD SHOWS, come to the Doctor's Office at once—not two days later.

GOGGLES have saved many men from blindness. Get them at Tool Crib and WEAR THEM when working on Cyanide furnaces, chipping, grinding, babbitting, breaking up concrete, shapers, and all other jobs where small particles fly.

Before working on ladders or scaffolds be sure to test them.

*Ford Motor Company.*  
DEPT. SAFETY AND FACTORY HYGIENE

**SAFETY RECORD:** One death by accident among 50,000 workmen during fiscal year 1918-1919.  
(Over)

Card to Introduce Safety Idea to New Employee

men were gathered into one end of the building and made as comfortable as possible on improvised seats. The talks were illustrated with objects that had and could cause accidents. As a result, this extremely hazardous department had no lost time accidents during safety week.

At the head of the article is shown one shift of

### To All New Employees

Badges are to be worn in plain view on the clothing above the shoulder line. They must not be defaced in any manner. Each man is responsible for his own badge, and should it be lost, a charge of \$5.00 will be made. When leaving the Company's employ badges are to be surrendered.

No Ford Employee is to work more than twelve (12) hours in any consecutive twenty-four (24) hours. There is no exception to this rule.

*Ford Motor Company.*

(Over)

General Rules Are Given on Opposite Side of Card

running boards, shields, etc. The meeting shown in the picture was held in celebration of no lost time accidents during safety week.



The Factory Paint Department Went 46 Consecutive Months Without a Lost-Time Accident

All new employees who entered the plant were given a card, here reproduced, to instill the safety idea while their minds were eager to learn of the company's policies. The card has suggestion value for broad use in industrial plants generally.

## OPPOSE PITTSBURGH BASING

### Attorneys-General of Two States Write to Attorney-General Daugherty

MADISON, Wis., July 15.—Attorney-General William L. Morgan of Wisconsin, has sent to Attorney-General Harry M. Daugherty a letter in which he says:

It has come to my attention that you have publicly requested expressions of opinion upon the proposed merger of steel producing corporations which is before your department for consideration. One matter that is of vital importance to the people of Wisconsin in relation to the steel industry is the practice of making steel prices upon a Pittsburgh base price plus the freight from Pittsburgh to the point of delivery. As you know, the Federal Trade Commission has made a formal complaint against the United States Steel Corporation and its subsidiaries with reference to this practice and is conducting an exhaustive inquiry into the matter. It has occurred to me that in connection with the proposed merger the method of fixing prices may have come before you for consideration, and in that event I wish to urge most strongly that nothing be done that will have a tendency to legalize or perpetuate the Pittsburgh plus system or to embarrass the Federal Trade Commission in its treatment of the question now before it. On the contrary, it is my earnest hope that in dealing with the proposed steel merger it will be possible for you to take positive action against the Pittsburgh plus practice and aid the nation to rid itself of that evil.

Pittsburgh plus has been for a number of years a matter of deep concern to the people of Wisconsin as a whole. The manner in which the interests of the State and its people are prejudiced by the practice is well expressed, though of course only briefly in joint resolution No. 31, adopted by the Wisconsin Legislature of 1921, of which I inclose a copy herewith. This resolution, in addition to setting forth the situation as it affects the people of this State, constitutes an official recognition by the legislative branches of our State Government of the public interest involved. I trust that the time is not far distant when the Pittsburgh plus evil will be permanently eliminated, and if you can do anything to aid in bringing about that result, either in connection with the proposed steel merger or otherwise, you will in my opinion be rendering a very great public service.

### Protest from Illinois

CHICAGO, July 17.—The recent invitation of Attorney-General Daugherty for expressions of opinion from those connected with the iron and steel trade on the mergers of independent steel companies now having the attention of the Department of Justice, has brought a response from Edward J. Brundage, Attorney-General, State of Illinois. In his letter dated July 8, Mr. Brundage, as did W. E. McCollum, secretary, Western Association of Rolled Steel Consumers, in a letter to the Attorney-General published in THE IRON AGE, July 13, page 85, emphasizes the harm that will be done business interests in this section if, as a result of the combinations, the "Pittsburgh plus" practice is made more solid. Mr. Brundage's letter reads in part:

This practice is injurious to the industries of this section of the country and it is contended complicates housing and building problems because of the increased cost of steel which results from the addition of the arbitrary amount to what would otherwise be the price of steel at mills in this section of the country. It is contended that this practice amounts to an unlawful fixing of prices and this contention forms the basis of the proceedings now pending before the Federal Trade Commission.

If the effect of the mergers under consideration by you is to put the combining concerns in a position where this practice is on a more solid basis, it would be harmful to the business interests of this section.

I suggest, therefore, that in the investigation of these mergers, consideration be given to the question which I have above stated and that no action be taken which can be construed as an approval of the "Pittsburgh Plus" practice or which will aid those who are maintaining it in making it more effective.

Superintendents and foremen will hold meetings, similar to those held during safety week, on the first work day of each month hereafter, to keep alive the spirit of co-operation which prevailed during the drive.

## Advanced Courses in Metallurgy at Carnegie Tech

Carnegie Institute of Technology, Pittsburgh, has been selected by the United States Naval Academy at Annapolis to give advanced courses in metallurgy to its graduate officers. The institution is the only school in the country chosen for this work. Beginning next September, the Naval Academy will send two ordnance officers, graduates of the academy, for a year's study in advanced metallurgy. The officers will be here for the full college year. Their studies will be graduate work in advanced metallurgy with some studies in electricity and physical chemistry. Other groups of graduate officers are assigned each year to various colleges or universities to study along specialized lines. F. F. McIntosh, associate professor in metallurgy at Carnegie Tech, will supervise the studies of the Naval officers. Lieuts. Gilbert C. Hoover and John H. Keefe have been assigned to take the work the next college year.

## Iron and Steel Companies Object to Freight Rates

WASHINGTON, July 18.—Eastern Pennsylvania iron and steel companies yesterday filed a complaint with the Interstate Commerce Commission, protesting against alleged discrimination against them and in favor of the Bethlehem Steel Co. in rates on steel products to New York. It is claimed that the rate from Bethlehem, Pa., to New York is 16c. per 100 lb., while the rate from plants of the complainants is 19.5c., a differential of 3.5c. or 70c. a ton. It is stated that if the rate from group B plants—that is, plants whose average distance from New York is 105 miles—were established on the same percentage of the fifth class as the rates from group A plants—that is, plants which are on an average distance of 175 miles from New York, the group B rate would be 16c., the rate from Bethlehem, or 57 per cent of the actual fifth class rate. It is further stated that if 16c. is the proper basis as related to the actual fifth class rate from Bethlehem, the rate from the other plants in group B should be 14c. and the rate in group A should be approximately 18c. per 100 lb. It is stated that the distance from Bethlehem and Nicetown, Pa., both in group B, to New York, is the same, yet there is a differential of 70c. in favor of the former. The complaining companies are the Alan Wood Iron & Steel Co., the American Bridge Co., the Lukens Steel Co., the Midvale Steel & Ordnance Co., and the Phoenix Iron Co.

## Coal and Coke Shipments

Figures recently made public by the Pittsburgh office, United States Engineers, on the movement of coal and coke over the Allegheny, Monongahela and Ohio rivers, in May and June line up closely with the increases recorded in the rail shipments during that month. Western Pennsylvania Railroad coal loadings which fell below 1000 cars daily about the middle of April increased steadily in May and June, and in the last week in June reached a daily average of 2450 cars. River shipments in net tons, make the following comparison:

	Coal		
	June	May	Increase
Allegheny .....	28,895	17,370	11,525
Monongahela .....	196,930	128,022	68,908
Ohio .....	106,011	138,350	*32,339
Total .....	331,836	283,742	48,094
	Coke		
	June	May	Increase
Monongahela .....	33,675	28,112	5,563
Ohio .....	16,600	16,765	*165
Total .....	50,275	44,877	5,398

\*Decrease.

# What Will Next Ten Years Bring in Steel?\*

Drift Toward Consolidation—Profits Through New Economies  
in Production, Not by Any Price Maintenance Policy—  
Leadership Ability for Future Not Lacking

BY A. I. FINDLEY, EDITOR THE IRON AGE

THE men of the steel trade—leaders, lieutenants, rank and file and all—were surprised at the way their business picked up four months ago. Some of them are not sure to-day that they know why the country's steel plants have been turning out products for weeks at a greater rate than was reached in either of the peak pre-war years, 1913 and 1914. Hopeful as prophecies were thought to be at the opening of 1922, no man of light and leading in the business went further than to say that operations might get up to 60 or 65 per cent at some time before the year ended.

This is not the first time steel men have been taken unawares. The ups and downs of the past forty years have shown so many sudden reversals of form that one of the most dependable formulas in iron and steel is that it is the unexpected that happens. Yet every time of prosperity regularly produces a crop of prophets who are confident that pig iron and steel will never again sell as low as in the years before that particular boom. Likewise, when they are groveling in the depths of depression no other industry can show so many men who see no chance for prices ever to rise to the mad heights reached in the last previous ascent when clamorous buyers took pig iron from the blast furnaces before it fairly had a chance to cool.

There must be some connection between these uncertainties of steel, and the kind of men who have led in the development of the industry in the United States. No doubt something inherent in the industry has developed in those who work in it the willingness to risk; it is also the fact that the courage to push out that has been shown by so many American steel captains has put its stamp on the whole industry. Karl Wittgenstein, Austrian steel master of twenty years ago, sometimes called the "Carnegie of Austria, was a close student of iron and steel progress in the United States. He found here a high development of the speculative faculty—speculative in the better sense of willingness to risk uncertainties in carrying on great enterprises. He praised the American "capacity for taking into consideration besides the visible factors also the uncertain ones lying in the future, and of coming to corresponding decisions even at the risk of having events turn out quite differently."

This tradition of the uncertainties of steel making in the United States and of the American way of meeting them may need revising as time goes on. Prophecy is daring business to-day, just following a year in which production fell to the lowest point on record in relation to existing capacity. But that was a sequel of the greatest of world upheavals. Those who are trying to look ahead in steel see tendencies apart from the readjustments from war conditions, and are thinking of the outcome of these tendencies in the steel trade of five years or ten years from to-day.

The drift toward consolidation is probably the most obvious fact in the industry to-day. While for one reason or another some companies that have been included in recent merger projects have decided not to go ahead with those particular plans, the movement toward large capital aggregates is likely to go farther. The answer to the advantages the Steel Corporation has, so far as these are due to its diversity of product and to its vast raw material holdings, may be two or three large companies with plants at the various strategic points of production and distribution. Whatever the technical or official outcome of the action of Western consumers to do away with Pittsburgh basing in the sale of steel, independent producers are bound to take such steps as will insure to the corporation's chief

competitors whatever benefits it now derives from the single-base régime.

## Element of Governmental Scrutiny of Mergers

It is interesting, in connection with present efforts toward consolidation, to see that altogether apart from any initiative of manufacturers the Government at Washington is now preparing to pass judgment in advance on steps the steel industry may take without fear of prosecution under the Sherman act or the Clayton act. This is the very thing Judge Gary proposed, when the Gary dinners were being called in question and when Congressman Stanley was putting steel men on the grill to extract the evidence on which the dissolution suit was brought in 1911. But the Department of Justice in the Taft and Wilson administrations—in the Roosevelt days also, with the single exception of the permission given for the purchase of the Tennessee company by the Steel Corporation—steadily declined to say in advance whether a contemplated plan of a corporation might be carried out without inviting Government prosecution. Now, at the instance of the Senator from Wisconsin, the Attorney-General and the Federal Trade Commission have said to those about to merge, "Do nothing until you see us."

Like the policeman at the crossing, these Government agencies have set the "Stop" signal, not fully realizing, perhaps, all that will be involved later in turning the target to "Go."

These recent Washington moves, that have had their place in the news of the day along with other incidents classed as political, may have more of a bearing on the future of the steel industry than has yet been suggested. Next to the railroads, coal mining has been a chief object of Government attention. There are obvious reasons for Federal oversight of transportation, and more than one situation in the coal mining industry in the past twenty years has warranted Federal action; but even in the war period, with steel the most vital of all war implements, the full co-operation and competent management of the heads of the industry were judged at Washington to be far preferable to Government control of plants or output.

Just now the future of steel manufacture in its relation to the public seems likely to turn on the view taken by official Washington of what is aimed at in the consolidations under way and others that may come forward. In view of what has happened to them in the past year, and of what is ahead when the real test comes after the coal strike, the independent producers of steel urge that the new consolidation movement represents an effort to give the Steel Corporation real competition and hence is in the public interest.

Those who have been declaiming at Washington against any further concentration in steel on the ground that monopoly is aimed at through final co-operation with the United States Steel Corporation forget the narrow ground on which the decision favorable to the latter was given in 1920. The participation of Justices Brandeis and McReynolds in any future suit based on proved co-operation between the Steel Corporation and its competitors would be quite certain to give a different outcome. The Steel Corporation seems to have had this well in mind in deciding its market policy since the famous suit.

The course of the steel market in the past two years gives no ground for expecting that the Steel Corporation will make the race easier for its competitors in the years just ahead.

Profits will be made in the coming five years by new economies in production and not by any policy of price maintenance entered into by the leading producers.

\*Reprinted by permission from *Forbes Magazine* of July 8.

And economy in production means that the steel companies will continue to be prodigal spenders for labor-saving, fuel-saving, and time-saving equipment and for new facilities to get increased tonnage. The steel company bond issues of the past few years are an index of the unending call for capital to provide new capacity and to make the old more efficient. That more than \$100,000,000 has been appropriated first and last by the Steel Corporation for Gary alone, suggests the scale on which other steel makers must lay out money to maintain their position. It is one of the reasons also for the effort to get greater strength by further consolidation.

The question may be raised whether the future will bring any change in the policy long followed in iron and steel, of building new plants when the pressure of demand is greatest, with the frequent result of having the newly finished capacity ready just as the market turns downward as depression comes on. Thus the new capacity at Gary lay quite undigested for three or four years. But each return of prosperous times has called for all the plants in existence and more; and so the process of over-building and of catching up has been repeated time after time.

More consolidations in steel might bring, in the next decade, some modification of this traditional practice. Blast furnaces and steel plants mean huge money outlays. One modern blast furnace with accessory ore yard and auxiliary equipment represents \$2,000,000, or four times the outlay of twenty-five years ago. Rolling mills for the production of finished steel can be built cheaply in comparison with the cost of the blast furnaces and steel works requisite to feed them. Thus the idleness of a rolling mill in time of depression is far less serious from the investment standpoint than that of blast furnaces and steel plants.

#### Carrying Large Stocks May Be the Rule

Strong companies may yet find that there are economies in carrying large stocks of raw and semi-finished products—pig iron, ingots, slabs and billets—with ample finishing capacity for the peaks in demand. The stored pig iron and raw or semi-finished steel would simply represent to an integrated company the putting of a certain amount of labor upon given quantities of ore and coal it has in the ground. It can be seen that the interest on capital required for carrying such stocks might be far less than that involved in idle plant, with the added advantage of having pig iron and steel on hand to answer the call of the market when the revival came.

These matters of organization, competition, and the control of the instruments of production, in the steel trade of the future are interesting, but not less so is the question of the lines of steel consumption that are likely to see the greatest development in the next ten years. Without doubt the largest increases in uses of steel will be in the uncounted and almost countless lines that are individually of so little importance that they are not commonly catalogued. Railroad building, and automobile outlets are impressive. A skyscraper and a Queensboro bridge are spectacular; but the demand for which the bulk of the new capacity of the country has been built in recent years is rather that which ramifies into hundreds of uses and into thousands of sales to individual buyers.

In 1887, thirty-five years ago, the 2,000,000 tons of rails rolled in American mills were nearly three-quarters of the entire output of finished steel. In 1920, rails were just 8 per cent of the total of more than 32,000,000 tons. The large place long held by rails in the steel trade is responsible for the erroneous but common belief to-day that railroad demand is the steel manufacturer's chief dependence. It is often said in the discussions of well-informed business men, that in one way and another the railroads take 40 to 50 per cent of all the steel turned out. It is doubtful if at any time in the past twenty years the railroad consumption of steel has been more than 25 per cent of the whole. In late years, the percentage has been under 20; in 1921 it probably was little more than 10 per cent.

The average man is astonished to be told that wire products, many of them the most tenuous forms in which steel exists, now represent a larger annual tonnage than steel rails.

The leading wire company now lists no less than 5000 distinct products and manufacturing uses of wire.

Food containers call for a million tons of steel a year in the form of tin plate, and this use of steel is growing every day as the army of delicatessen buyers grows. In pre-prohibition days the crimped bottle cap was responsible for 50,000 tons a year on the books of the mills rolling steel for tin plate.

#### Steel Demand of the Future

A Central Western steel maker, who expects a 60,000,000-ton output for the United States by 1930, silences doubters by pointing out that there is not a civilized man, woman, or child on earth to-day who does not carry around from a quarter-pound to a half-pound of steel in pockets or clothing. There are the pen knife, the key ring, the belt buckle, the suspender and garter buckles, the pencil tip, the shoe shank, the shoe heel full of nails, and the steel buttons, eyelets, and snaps. There is practically nothing that the man of to-day eats or wears or uses in his work that is not made of iron or steel or produced by iron and steel machinery. From the toy shop to the automobile plant turning out a million cars in a year, the whole range of modern manufacture shows an increasing penetration of steel into every industrial activity and into the every-day life of the people.

Steel production has depended only in part on growth of population for its gains. Abram S. Hewitt, in his famous forecast of 1890, when British iron masters visited the United States in a body, advertised to the world the steady per capita increase in steel consumption year by year that even then had become an American habit. In 1890, in order to meet the demands, our steel works turned out 140 pounds per inhabitant. By 1900 the per capita had gone up to 347 pounds; by 1910 to 585 pounds; and by 1920 to 858 pounds. Steel is constantly replacing wood, and the great expansion in concrete work, which it was once thought would be at the expense of steel, has meant a larger call on the steel mills. No less than 600,000 tons of steel for reinforcing of concrete was produced in 1920.

Perhaps the most important changes to be looked for in the steel industry in the next ten years will be those affecting personnel.

#### Average Age of Steel Heads 59 Years

In the case of the Steel Corporation, some of these changes may come before the decade is half run. Breaks in the corporation's organization have been few—apart from the loss, one at a time, of five men whose names were prominent in the list of Andrew Carnegie's "young partners"—and the continuity in its management has been one of its great factors of strength. But every year now adds to the probability of new faces appearing in its higher official family. The average age of nine of its heads—chairman, president, and the seven presidents of manufacturing subsidiaries—is 61 years. The youngest of these subsidiary presidents is 53, and the oldest is 64.

Very similar is the showing in respect to the heads of important independent steel companies. Nine of them, with an aggregate of 532 years, average 59 years, and 59 is also the average age of the seven presidents of Steel Corporation subsidiaries.

Thus it may fairly be said that the steel industry gives conspicuous exemption from the edict of Osler. No other shows a stronger official personnel, and no other represents higher standards of executive capacity or greater mastery of the complicated problems of modern industry.

The past twenty years have been the most important in American industrial history, and it is fortunate that in such a period the steel trade has had the guidance of such practical hands. At the works, direction of operations has fallen to aggressive, well-trained men—school-and-works-trained, and where promotions have been made to higher executive places, they have been almost entirely of operating men. The oncoming second line is a strong one, and the industry need have no fear for the years just ahead, as retirement time comes for one and another of the seasoned leaders of to-day.

## HOIST FOR CUPOLA CHARGING

### Monorail Machine for General and Special Work —One Operator Controls All Movements

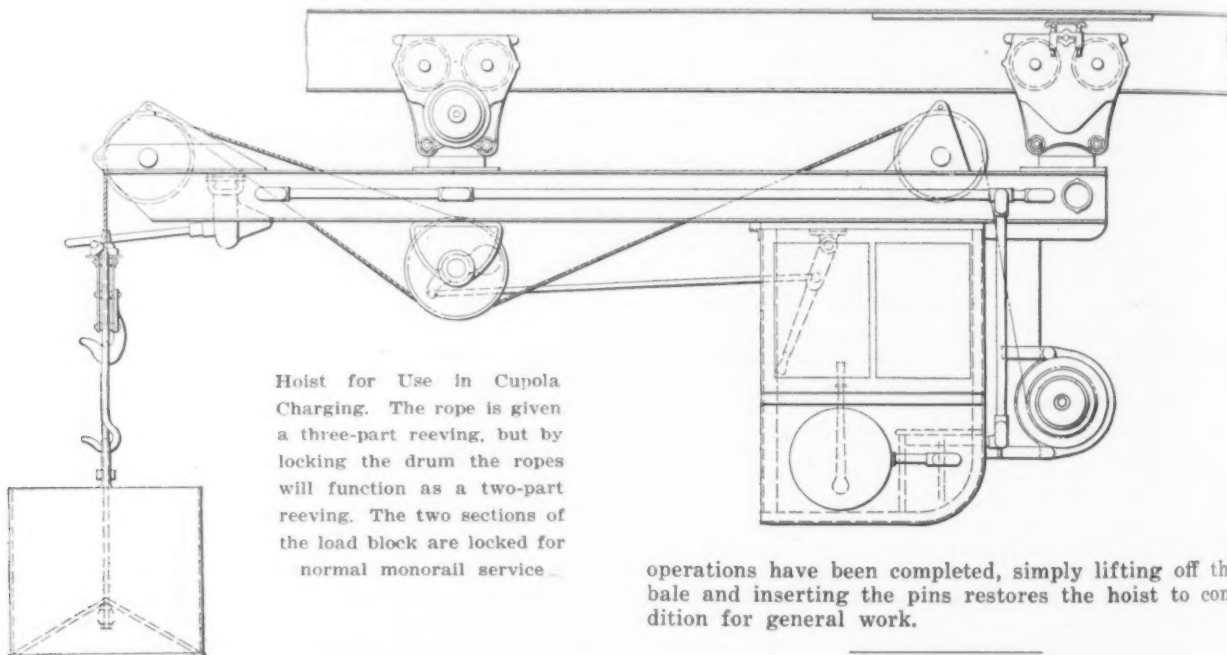
The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., recently designed a cupola charging attachment for its form 24 C. H. monorail hoist, arranged as shown in the accompanying illustration.

This machine is primarily a general service monorail hoist for all types of work for which hoists of that type are adapted, although extending its use to cupola charging has made several modifications of the standard form 24 unit necessary. In the machine illustrated the hoisting rope and load block are pendant from an extension of the hoist frame, which places them forward of the front trolley a sufficient distance to permit a suspended bucket to enter the cupola. In the standard machine, on the other hand, the hoisting rope and load block hang from the hoist frame a short distance back of the front trolley.

The hoisting rope is given a three-part reeving. The dead end of the rope is attached to an indepen-

forward until the hooks enter the loops as far as they will go, the hoisting motion being started and the bucket lifted to a height that permits it to enter the cupola door, the hoist being then traveled forward until the bucket enters the cupola and is central with the cupola walls. The lowering motion is started, the bucket descending into the cupola to within about 4 ft. of the top of the materials previously charged. The hand brake controlling the rotation of the auxiliary drum is set, the drum stands still, as also the upper section of the load block, the bale and the body of charging bucket. The movable bottom of the bucket continues to descend until the bucket is wide open when the lowering motion is stopped.

The contents of the bucket having been discharged, the hand brake is released and the bucket closes by its own gravity. The bucket is then hoisted to a level with the cupola door, the hoist traveled back, and the bucket deposited for refilling. It is detached by movements the reverse of those used in attaching it. Attaching and detaching buckets to the hoist, as well as other features of charging the cupola, are easily conducted by the hoist operator alone. When charging



dently movable section of the load block, and one loop of the hoisting rope, which would normally pass around an upper sheave, is deflected over sheaves to an auxiliary winding drum located under the main frame. This drum is provided with a hand brake by means of which the drum and attached ropes may move in a manner normal for the ropes and upper sheave for a three-part reeving. By locking the drum the ropes will function as a two-part reeving; the dead end for the time being is at the periphery of the auxiliary drum and the third part of the rope, which was normally the dead end, with attached parts remaining stationary. The two sections of the load block are provided with pins for locking them together for normal monorail service, and to separate them so that they may function independently when operating as a cupola charging machine.

For cupola charging a bale carrying two extra hooks is hung across the top of the load block, and the pins are withdrawn. The hoist is then ready for cupola charging. The weight of the bale is sufficient to overcome the running friction of the hoisting rope, and the load block with its three hooks moves up or down as a unit just as if its several parts were connected together.

With the loaded charging buckets placed in line directly under the monorail runway, the operation of the charging hoist proceeds as follows: The hoist load block is lowered so that the three load hooks come opposite the three loops, forming the suspension members of the bucket. The hoist is then traveled

operations have been completed, simply lifting off the bale and inserting the pins restores the hoist to condition for general work.

## New German Method of Hardening Steel

A new process for hardening steel has been patented recently in the United States by Wilhelm Winter, Remscheid, Germany. It is the result of experimental work by the inventor in his steel hardening plants at Remscheid, known as the Westdeutsche Stahl Harte Gesellschaft. Since the process was perfected over a year ago it has been in use in a number of German plants producing machine tools, gears, axles, springs, etc. An unusual degree of hardness is said to result from the application of the process and a considerable saving in cost.

There are two treatments, a heating bath and a cooling off process. The material to be hardened is first placed in the heating bath, where it remains until it obtains a temperature equal to that of the bath. When this stage is reached it is taken out and passed through a cooling-off process, which is accomplished without the use of any materials such as oil, water or compressed air. The patentee states that the feasibility of the chemical reactions appearing in the treatment has been demonstrated to the German patent office by laboratory analysis and experiment, and that the tests and demonstrations took place in the Technical High School at Charlottenburg.

Henry Engels, 55 Buffalo Avenue, Brooklyn, acquired the American patents late in June. He plans to have in operation soon a plant and testing laboratory for demonstrating the process. Hans Becker, Remscheid, Germany, recently arrived in the United States and will be associated with Mr. Engels in this work.

# What Is Today's Shortage in Pig Iron?

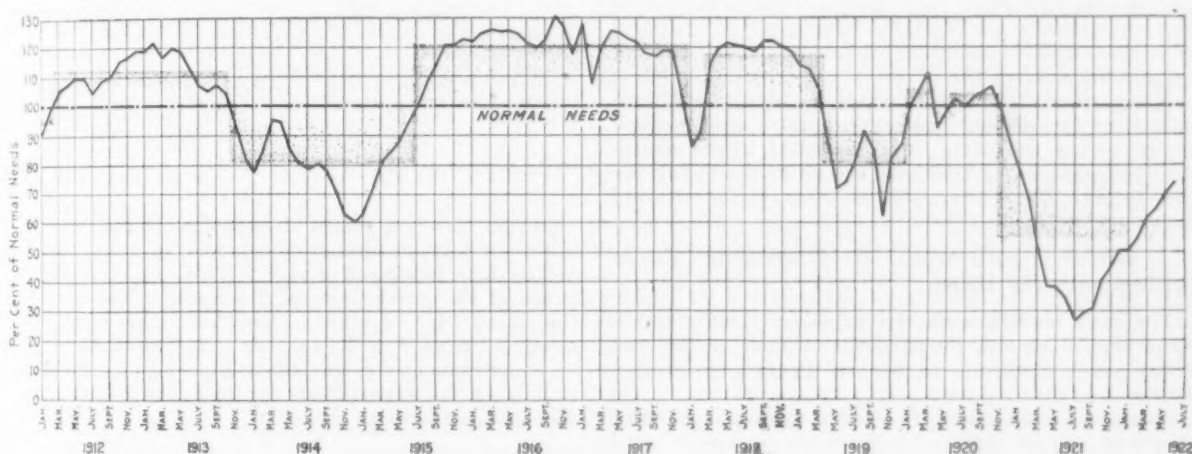
The Trend of the Years Before the War and the Low Rate of Consumption Since Indicate a Deficiency of Over 25,000,000 Tons

IF we take the mean of the ups and downs of production over a number of years, we approximate the trend of consumption or demand. Such a trend line extended for a period beyond the years of observation gives an indication of the approximate needs of the extended period. For pig iron such a curve and the corresponding figures of the theoretical requirements were given in *THE IRON AGE* of March 3, 1921.

Considering these needs as normal, then for a given month the actual production either more than satisfies the current normal or is short of doing so, or it may equal the calculated amount. Periods of excess must then be followed by periods of deficiency. Assuming no great change has occurred meanwhile in general conditions, the consumption of the material is following

estimate any hoped-for increase in exportation. Should such increase occur it might indeed balance some other opposite factor not now apprehended. Naturally the records of a new group of years will bring about modifications of the equation which mathematically may be given to the trend line, and the normal line is thus subject to a change as sufficient additional information becomes available.

The shaded areas above and below the normal line are equivalent to the areas inclosed by the production curve. While they give an idea of a great deficiency in the amount of pig iron made, the theoretical deficiency is even greater, as to-day's normal needs are considerably greater than even those of war time. In the article referred to, it was shown that the production



Excesses and Deficiencies in Pig Iron Production from Month to Month, the Comparison Being with Theoretical Requirements Determined by a Balancing of the Ups and Downs Over the Fifteen Years Before the War. The deficiency since early in 1919 appears to be 31 million tons to date. Allowing one-half of the 13 million tons excess production in the war period for peace time needs would leave a shortage of 25 million tons

the law indicated by the past. This may mean that new uses are constantly being found for iron and its derivatives, that per capita consumption is therefore on the increase, and that the total is further swelled by increase in population. When against a line corresponding to the normal are plotted the percentages above or below the normal, then the eye gets a picture of the over-supply or under-supply.

A trend line over too long a number of years may cover such epochal changes in the material, such as a revolution in process, and therefore a revolution in possibilities of use or of price, that even short extensions into the future may exaggerate unduly the indications of the past. Thus, in the period of the war, so great was the dislocation of peace-time industrial activities that production statistics for that time might easily give an incorrect indication when combined with those of periods affected little or not at all by war.

In the accompanying curve for pig iron deviations from normal the years of the war were not considered. Eliminating from the calculation the unusual stimulus for output kept the line of apparent or theoretical needs lower than it otherwise would have been. In other words, the excess above the normal in the war period would not be so great as is indicated and deficiencies later would be greater. Moreover, no attempt has been made in determining the normal to assume or

for the fourteen years ended with 1913 was hardly 1 per cent greater than the total needs for that period. Production was 309,453,000 tons and the theoretical requirements totaled 306,450,000 tons. Thus it may be said that 1914 opened with no deficiency. Then came subnormal production for all of 1914 and half of 1915 until war demand turned the scale, and we had 45 months of supernormal production, save for the months of January and February, 1918, when there was a temporary check, because of shortage of fuel and collapse of transportation, due in turn to weather of extreme severity. The 45 months of war activity gave an excess over theoretical needs of two and one-half times the deficiency of the 18 months immediately preceding, or a net excess of 13 million tons.

But even assuming the country started at the end of the first quarter of 1919 with this excess of 13 million tons available for later consumption, there is still a great apparent deficiency. There were 9 months of under-production (the remainder of 1919), some over-production for the first three months of 1920, a slight falling backward for 2 months, then 5 months more on the positive side and finally the 20 months up to date, most of the time far below theoretical needs. In these 39 months, there were only 8 with output greater than needs.

The areas show that the deficiency due to sub-

normal production was fully 28 times the excess production. The figures indicate over 31 million tons deficiency, so that if the 13 millions excess of the war period were available, as it was not (much going into ships, shells and engines of destruction not now in existence), there would still be a shortage of 18 million tons; or if one-half of excess war production could be charged against peace-time pursuits, the shortage

would be 31,000,000 minus 6,500,000, or 24,500,000 tons.

A decided change in the rate of consumption would need to be shown to nullify the claim of the shortage. It is to be noted that in spite of the improvement since July, 1921, when the production was only 27½ per cent of needs, the output of June, this year, was only 75 per cent of the normal and not as much as two-thirds of the total capacity of the country.

## Methods for Locally Preventing Case Hardening

### Protective Layers Applied with a Brush and Coating with Copper Compared by French Authorities

**M**ETHODS for locally preventing case hardening is the title of an interesting article in *Revue de Metallurgie* for April, 1922. The authors are Jean Galibourg and Marcel Ballay.

A method often employed is to cover the desired parts to be protected with a thin coating of copper, deposited electrolytically. This method presents numerous advantages, but it requires rather costly material and the method takes a long time because it needs two principal operations: First, the varnishing of the parts to be case-hardened and, second, the electrolytic coating of the remainder of the piece.

Many efforts have been made to obtain a simple method for the efficient protection against case hardening by coating the parts to be protected in one operation by a layer impermeable to the gases producing the cementation. The authors publish their results obtained on various methods.

#### I. Direct Application of Protecting Layer Applied with the Brush.

We have started with the principle clearly established by Guillet and Bernard that copper is the best of the usual materials to use as an anticementation coating.

**Organic Varnish and Powdered Copper.**—A paint formed of copper powder and a varnish, the base of which was resin and turpentine, has been used previously as a protection. This paint protects very imperfectly. A microstructure is shown in the original paper giving the penetration of carbon in material covered with this paint. The coating is also very fragile and is easily detached during handling. The inefficiency of this protection seems to come from the presence of carbon in the paint itself.

**Silicate of Soda and Powdered Copper.**—Very good results are obtained by replacing the organic varnish with commercial silicate of soda. A microstructure shows the results obtained on very soft steel, using a mixture of one part silicate of soda and one part powdered copper by weight. The case hardening is absolutely nil. This paint, copper-silicate, dries rapidly and resists rubbing and blows very well. As against this material may be advanced its high price, due to the high cost of powdered copper and its adherence to the piece after cementation and quenching. There is, as a matter of fact, a great deal of difficulty in detaching the coat which limits its use to the protection of parts that have to be afterwards machined.

**Silicate of Soda, Powdered Copper and Inert Material.**—The addition to the copper of a convenient inert material allows the cost of the coating to be reduced and the adherence after quenching. In the following table are given the results of some of the tests on bars case-hardened to 1 mm. depth:

Composition	Results	Observations
Powdered copper and silicate.....	Good protection	The coat is very adherent after quenching.
Copper ¾, powdered emery ¼ and silicate.....	Good protection	The coating detaches after quenching.
Copper ½, powdered emery ½ and silicate.....	Feeble penetration	The coating detaches after quenching.
Copper ¼, powdered emery ¾ and silicate.....	Strong penetration	The coating detaches after quenching.
Copper ¼, kaolin ¼ and silicate.....	Bad protection	
Copper ¾, ferric oxide ¼ and silicate.....	Good protection	The coating is adherent after quenching.
Copper ½, ferric oxide ½ and silicate.....	Feeble penetration	The coating is adherent after quenching.
Copper ¼, powdered emery ¼, borax ¼ and silicate..	Good protection	Difficult to use. The paint thickens rapidly. Coating very adherent after quenching.

It is seen that among the materials tried, as shown in the preceding table, two only are worthy of further use, namely, powdered emery and oxide of iron. The oxide of iron should be eliminated because the coating is only removed with great difficulty after the operation.

**Other Mixtures With or Without Copper.**—The results with other mixtures with or without copper are:

Composition	Results
Aluminum and silicate.....	Protection very imperfect.
Copper ¾, aluminum ¼ and silicate.....	Protection imperfect.
Copper ¼, aluminum ¾, powdered emery ½ and silicate.....	Protection imperfect.
Powdered emery and silicate.....	Bad protection.
Kaolin and silicate.....	The coating cracks or drops away from the steel.
Oxide of iron and silicate.....	The coating cracks or drops away from the steel.

From this last series of experiments the conclusion is drawn that, unfortunately, powdered aluminum cannot replace powdered copper. This is regrettable because of the lower price of aluminum. The results of the three last mixtures show that the presence of powdered copper in the coating is indispensable.

**Conditions of Use of Copper-Emery-Silicate Paint.**—Following the experiments outlined above the mixture decided upon was as follows:

Powdered copper.....	2 parts by weight
Powdered emery.....	1 part
Commercial solution of silicate of soda in sufficient quantity to give a thick paint.	

The coating obtained with this mixture is very adherent before heating and is easily removed from the steel after case hardening. The best method of preparing the paint is to mix the powdered copper and emery before use and just before applying to the steel adding the necessary amount of silicate of soda to give the desired consistency. The silicate is added little by little so as to make first a thick paste and then is brought to the necessary fluidity to flow freely from the brush. If while being used the mixture thickens a little more silicate is added.

**Removal of Grease from the Steel.**—Experience has shown that the paint will only protect properly if the parts are perfectly free from grease. Removing grease with a bath of hot potash solution is altogether insufficient, the mineral oils being only partially or not at all emulsified. The simplest and the most efficient method of removing grease seems to be to heat the samples in a furnace to about 500 deg. C. (932 deg. Fahr.), avoiding in all cases a red heat. From numerous tests made under these conditions carried out on several thousand pieces good results have always been obtained.

The question of finding the hard parts in the protected areas is made very simple after quenching. The

pieces, sand blasted with care, are immersed for one or two minutes in a copper reagent, similar to the Stead reagent. The parts not case hardened are strongly covered with copper, while the case-hardened parts are not affected. Further, this may be proved by means of a file or by a Brinell hardness test.

**Application and Drying of the Coating.**—A coating is required of about  $\frac{1}{2}$  or  $\frac{3}{4}$  mm. thick, in order to protect against case hardening 1 mm. deep. When the paint is correctly applied drying takes about 15 min., and at the end of this time the pieces may be handled without danger. In every case the pieces may be placed in the boxes 1 hr. after being covered with the paint. Where there is need for speed or if a rapid drying is necessary on account of the shape of the piece (for instance, protection of salient angles) the paint may be applied to pieces previously heated to 70 to 90 deg. C. (158 to 194 deg. Fahr.); drying is then quite rapid and the pieces may be placed in the boxes 15 min. after.

**Comparison of Price Compared with Electrolytical Copper Treatment.**—If the simple cost of materials is considered the advantage is with the electrolytical method, but if it is remembered that painting with the silicate allows four times the number of pieces to be treated and does not require the expensive installation of baths, etc., the advantage is very clearly in favor of painting. It is very evident that the choice of one or the other method depends entirely on the kind of materials to be protected against case hardening. In the case of large pieces of which only a small part is to be case hardened the advantage is greatly with electrolysis.

## II. Coating by Immersion in Copper Solution.

As is well known, iron displaces copper from a copper solution and produces a deposit of copper, the appearance and compactness of which differ according to the solution used. If an ordinary solution of copper chloride or copper sulphate in water is used the iron or steel is covered very rapidly with a powdery and a fragile deposit, which does not give any real protection against case hardening. If chloride of iron is added to ordinary copper chloride solutions in increasing quantity the deposit is produced much more slowly and is more adherent, according as the amount of chloride of iron is greater. In every case the most compact deposits detach in little scales if the action is prolonged long enough to give a thick coating. Ammoniacal chloride of copper solution (the Heyn reagent) gives a similar deposit that scales off when it reaches considerable thickness. The coating obtained with alcoholic solution, such as the Stead reagent, is continuous resistant and similar to an electrolytic coating. These methods were carefully tried out by covering the coating obtained with glue and solution of gum-arabic.

The results obtained were not better than from electrolytic coatings and like them required a preliminary covering with varnish on the parts to be afterwards case hardened. The only case where their use would seem to be indicated would be if one wished to protect the end of a piece by immersing the part to be protected in a dish or vat at a constant level. In this case the solution with chloride of iron and water or alcoholic solution would seem to be the best. G. B. W.

Civil service examinations are to be held by the United States Civil Service Commission, Washington, for an assistant examiner of the patent office, for an instructor in machine guns and armament at Raritan Arsenal, Metuchen, N. J., and for instructor in the ordnance department at Watertown Arsenal, Mass. Applicants should apply for form 1312, stating the title of the examination desired.

Construction of foundations for the new mechanical puddling plant at Warren, Ohio, to be erected by the Youngstown Steel Co., Youngstown, will commence during the next two weeks, and will be carried forward by the company's own organization. Excavation is virtually completed.

## MALLEABLE CASTINGS

### Great Improvement Made in Past Ten Years Described

The story of the great improvement in the quality of the malleable iron castings during the past few years is told in an interesting 32-page illustrated booklet entitled "Certified Malleable in Transportation and Industry," just issued by the American Malleable Castings Association, Cleveland. This recounts the results of the efforts of the association through its research department to improve malleable castings. It is asserted that less than 10 years ago there was little definiteness to the physical properties of the malleable iron and that there were virtually as many varieties as there were foundries making it. Co-operative efforts were started in 1913 by the 25 members of the association, which has since increased its membership to 50. Through these efforts, it is stated that the manufacture of malleable iron has been changed from a hit or miss proposition to a scientific basis.

When the research work was started, with a view of improving the physical properties of malleable iron, members were required to submit test bars daily. At that time the specifications of the American Society for Testing Materials for malleable iron called for a tensile strength of 38,000 lb. and 5 per cent elongation in 2 in., but this specification exceeded the product of many foundries. Through individual plant inspection the adoption of more successful practices and the regular submission of test bars, it was not long before a majority of the malleable foundries were making castings exceeding the A. S. T. M. specifications and subsequently at the solicitation of this association these specifications were raised to 45,000 lb. tensile strength and  $7\frac{1}{2}$  per cent elongation in 2 in., this specification being later adopted by the Society of Automotive Engineers. The association was inspired by its success to further improve its products and as a result a new specification of 50,000 lb. per sq. in. tensile strength and 10 per cent elongation has been adopted recently. It is pointed out that other desirable properties have shown even greater improvement. Experiments have been conducted to develop soundness, machining qualities and finish. The use of chills has given way to a proper proportioning of gates and risers, so that voids due to unequal cooling of the metal may be eliminated rather than driven to other parts. Scaled castings have been eliminated by the proper selection and treatment of packing materials and the proper protection of casting during annealing.

### Rôle of the Microscope

The practice of issuing certificates of merit to foundries whose products meet the rigid requirements of the association, from which developed the term "Certified Malleable Castings," is described, as well as some of the manufacturing processes. The microscope is given credit for accomplishing much in bringing malleable castings to their present high standard of quality. It is stated that one of the most popular fallacies regarding malleable castings was the belief that the valuable properties of the casting is confined to its surface and that it has a tough outer skin with a hard brittle interior. It is pointed out that a study of the better malleable casting with the use of the microscope revealed that malleability was not due exclusively to the decarbonizing effect of the packing material, but rather to the breaking up of the hard carbides and the formation of ferrite or carbonless iron, the most ductile form of the metal, and that this was not confined to the outer layers, but extended to the center, thus substantiating the theory on which present day American practice is founded.

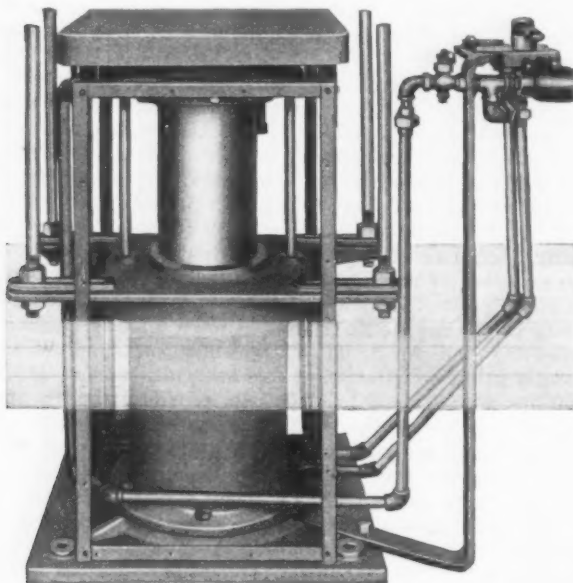
Comparisons are made of the physical and mechanical properties of malleable as compared with grey iron and steel castings, drop forgings and compressed steel and attention is called to the easy machining qualities of malleable iron. Numerous uses of malleable castings are listed and it is stated that from 200 to 250 lb. of malleable castings are now used in many of the best types of automobiles for various vital parts.

### New Jolt Stripper Molding Machine

A new style jolt stripper of the type shown in the accompanying illustration has been added to the line of the Arcade Mfg. Co., Freeport, Ill.

The new machine has a 6-in. jolt cylinder and a 12-in. air strip. In this design the stripper frame, which carries the pins for engaging the stripping plate, or the flask when a stripping plate is not used, is mounted on a ring piston. The latter is guided around the jolt cylinder column and inside the cylinder shell at the bottom of the machine. For a 12-in. lift the ring piston is provided with an 18-in. bearing on the guide column, which is intended to assure perfectly vertical motion that will lift a flask with the sand from a pattern having the minimum of drag.

The 12-in. strip machine is placed with about half its height below the floor level, those with the 8-in.



Jolt Stripper Molding Machine. The stripper frame is mounted on a ring piston

strip being placed on top of the floor. The lifting pins, which engage the stripping plate or flask, are adjustable for flasks of different sizes. This equipment is made also with hand strip and with two lift cylinders for long flasks.

### Papers for Steel Plant Electrical Engineers Convention

A tentative list of the papers to be presented at the sixteenth annual convention of the Association of Iron and Steel Electrical Engineers at Cleveland, Sept. 11 to 15 inclusive, is as follows:

"Improvement in Efficiency of Electric Power Supply" by Dr. Charles P. Steinmetz, chief consulting engineer General Electric Co., Schenectady, N. Y.

"A Review of Steel Mill Electrification" by B. G. Lamme, chief consulting engineer Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and Wilfred Sykes, assistant to operating vice-president Steel & Tube Co. of America, Chicago.

"Judging Combustion from Gas Analysis" by A. G. Witting, assistant chief engineer Illinois Steel Co., Gary, Ind.

"Electrification of the International Nickel Company's Works for Monel Metal" by F. C. Watson, electrical superintendent International Nickel Co., Huntington, W. Va.

"The Gas Engine as a Prime Mover for Power Generation" by D. M. Petty, electrical superintendent Lehigh plant, Bethlehem Steel Co., South Bethlehem, Pa.

"Steam Turbines" by L. W. Heller, assistant superintendent power stations Duquesne Light Co., Pittsburgh.

"Some Considerations in the Electrification of the Steel Plant Railroad Yard" by R. B. Gerhardt, electrical superintendent Bethlehem Steel Co., Sparrows Point, Md.

"Power in the Iron and Steel Industry" by D. B. Rushmore, consulting engineer General Electric Co., Schenectady, N. Y.

"Boiler Practices of 1922," a topical discussion by J. B. Crane, combustion engineer George T. Ladd Co.; E. R. Fish, vice-president Heine Boiler Co.; R. M. Rush, Springfield Boiler Co.; R. E. Butler, Babcock & Wilcox Co.; F. Hodson,

Electric Furnace Construction Co.; Professor Edgar Kidwell, general manager Kidwell Boiler & Engineering Co.

"Control Standardization" by F. W. Cramer, engineer of tests Cambria Steel Co., Johnstown, Pa.

"Motor Standardization" by D. M. Petty.

"Investigation of Insulators for Steel Mill Service" by A. R. Leavitt, engineer of tests Carnegie Steel Co., Duquesne, Pa.

"Electric Furnaces" by E. T. Moore, electrical engineer Halcomb Steel Co., Syracuse, N. Y.

"Lighting in Steel Plants" by R. H. Bauer, electrical engineer Carnegie Steel Co., Clairton, Pa.

"The Question of Safety in Steel Mills" by F. A. Wiley, electrical superintendent Wisconsin Steel Co., Chicago.

"Education" by L. F. Galbraith, electrical superintendent West Penn Steel Co., Brackenridge, Pa.

"Electrical Developments in 1922" by R. B. Gerhardt.

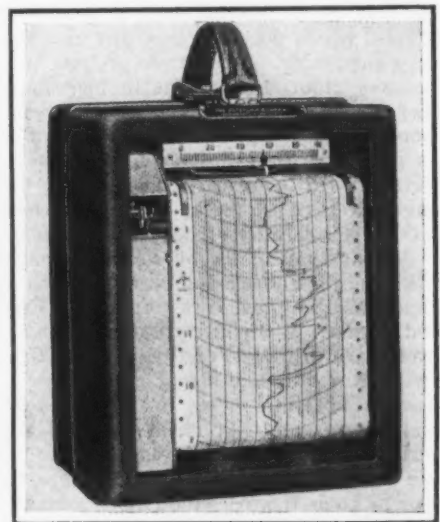
"Crane Standardization" by R. S. Shoemaker, superintendent of maintenance American Rolling Mills Co., Middletown, Ohio, W. S. Hall and E. Friedlaender.

### Combination A. C. and D. C. Voltmeter

A graphic voltmeter known as the Utility and said to be equally accurate on all commercial frequencies of alternating current and direct current as well, has been brought out by the Esterline-Angus Co., Indianapolis.

The meter, shown in the accompanying illustration, is made of the portable type, the case being of aluminum, finished in hand-rubbed, baked enamel. The clock provided is an 8-day marine type, inclosed in a separate case, and five hourly chart speeds,  $\frac{1}{4}$ ,  $1\frac{1}{2}$ , 3, 6 and 12 in. per hour are obtainable. The clock can also be fitted to give additional hourly chart speeds, and the same speed for inches per minute as well. The chart is 6 in. wide and 90 ft. long.

The measuring element incorporates unique features, a molded bakelite frame being used to give high insulation and accurate assembly. The moving system, instead of being mounted on a staff carried by pivots



Voltmeter for Both Alternating and Direct Current Service

and jewels, is supported on a taut steel suspension wire. This arrangement is intended to eliminate friction and make the instrument really portable, because the suspension is not affected by shocks, jars and vibration. The ink well and the damper are molded integrally with the frame, and constructed to eliminate spilling of the ink with ordinary handling.

The instruments are available in the following ranges: 0-150; 0-300; 0-600 and 0-750, and can be furnished with combinations of two, three or all four of the ranges given.

The Kilby Mfg. Co., which recently resumed the operation of its foundry in Cleveland on an open shop basis, has brought suit asking for a restraining order against members of the union to prevent them from picketing its plant.

# Electrical and Magnetic Weld Testing\*

## Their Application to Butt-Welded Steel Plates—Comparison With Physical Tests—Commercial Possibilities of Magnetic Testing

BY T. SPOONER AND I. F. KINNARD

IN spite of the very rapid progress made in recent years in the application of arc and gas welding, this progress would have been more rapid if at the same time there had been developed a reliable and simple method of determining the quality of welded joints. Provided plenty of reliable and competent operators are available, it is well known that many important structures such as large tanks, steel ships, boilers and perhaps the steel frameworks of bridges and buildings could be safely joined together by welding alone. However, since the results are always in doubt where the human element enters in and since visual inspection alone will not reveal the presence of slag inclusions, incomplete fusion of metal, etc., the applications of welding methods have been greatly retarded for important structures where reliability is essential.

There are various possible methods of inspection available such as X-ray analysis, acoustical methods,

weld, the current would have distributed itself inversely as the resistivity and the potential drop across the various portions of the weld would have been nearly the same regardless of the quality.

**Electrical Tests.**—The apparatus constructed to make use of the electric current for weld testing is shown in Fig. 1. The current, in this case 100 amperes direct current, was passed into the plate through two heavy brass posts  $a_1$  and  $a_2$ . A galvanometer was connected through the switch  $S_1$  to either  $b_1$ - $b_2$  which was across the weld, or to  $b_3$ - $b_4$  which was across an equal distance on the plate. Consequently, readings could be readily obtained for any point in the weld which indicated the difference, if any, between the weld and plate at that point. In general the weld had a higher resistance than the plate and consequently the potential drop was greater for the former. The difference between the above readings expressed as a percentage of the plate readings represents the percentage decrease in the quality of the weld based on the plate. The quality of the weld is expressed as 100 minus the percentage decrease as just defined.

The scale was first removed from the plate over the portion to be tested. The plate was then marked off into 1-in. strips and readings were taken at the center of each strip. In all cases these readings were repeated several times and it was found that reasonable checks could be obtained.

**Magnetic Tests.**—A magnetic tester was designed incorporating the same general principles utilized in the electrical method. Fig. 2 shows the general arrangement. A method of measuring magnetic potential drop was originally described by Chattock in England and was later used by Rogowski in Germany. A modification of the general principle, due to Fahy and incorporated in his Simplex permeameter, was used

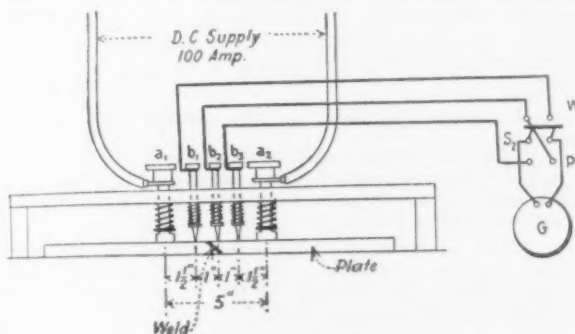


Fig. 1.—Diagram of Apparatus for Electrical Tests of Butt-Welded Joints of Steel

electrical tests, magnetic tests, etc. This paper will describe some preliminary laboratory tests to determine the possibility of applying electrical and magnetic methods for testing the quality of butt welds joining steel plates. These preliminary tests were merely to determine whether or not such methods showed promise of ultimate success and not to develop commercial testing apparatus.

### Samples

Four pairs of steel plates having the following dimensions were butt-welded by an experienced operator:

Plate	Thickness, In.	Length of Weld, In.
A .....	1/2	16
B .....	3/4	24
C .....	1 1/2	24
D .....	1 1/2	24

The joints were made according to a predetermined schedule and were designated by the welder as good, fair and poor, over various sections as will be noted later.

### Methods of Test

The method of application was similar for the electrical and magnetic methods of test and consisted in measuring the electrical or magnetic potential drop across the weld with a definite e.m.f. or magnetic potential applied on opposite sides of the weld. This drop was compared with the drop over an equal length of unwelded plate. The e.m.f. or magnetic potential was applied at points fairly close to the weld in order to localize the effect. If the e.m.f., for instance, had been applied at the edges of the plate parallel to the

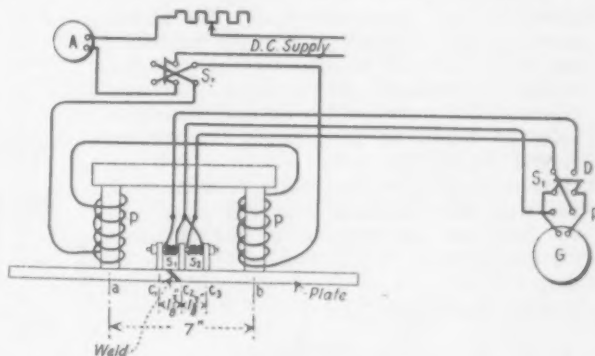


Fig. 2.—Diagram of Apparatus for Magnetic Tests of Butt-Welded Joints of Steel

in our tests. Fig. 2 shows the general arrangement of the apparatus and connections. In this case the soft iron posts  $c_1$ ,  $c_2$  and  $c_3$  were used as potential contacts and the drop in magnetic potential across the weld and plate respectively was obtained ballistically by means of the air coils  $s_1$  and  $s_2$  which were connected to a ballistic galvanometer. The set-up was arranged so that when switch  $S_1$  was in position  $D$  the coils were connected differentially, and when in position  $P$  the coil across the plate only was connected to the galvanometer. Only sufficient exciting current was used to induce a flux in the plate at about the value of maximum permeability, as it was found for instance that 0.5 ampere worked better than 2 amperes.

After experimenting it was found that for the most consistent results it was necessary to raise the poten-

\*From a paper delivered at the annual convention of the American Society for Testing Materials at Atlantic City, N. J., June 26 to 29. The authors are research engineers, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

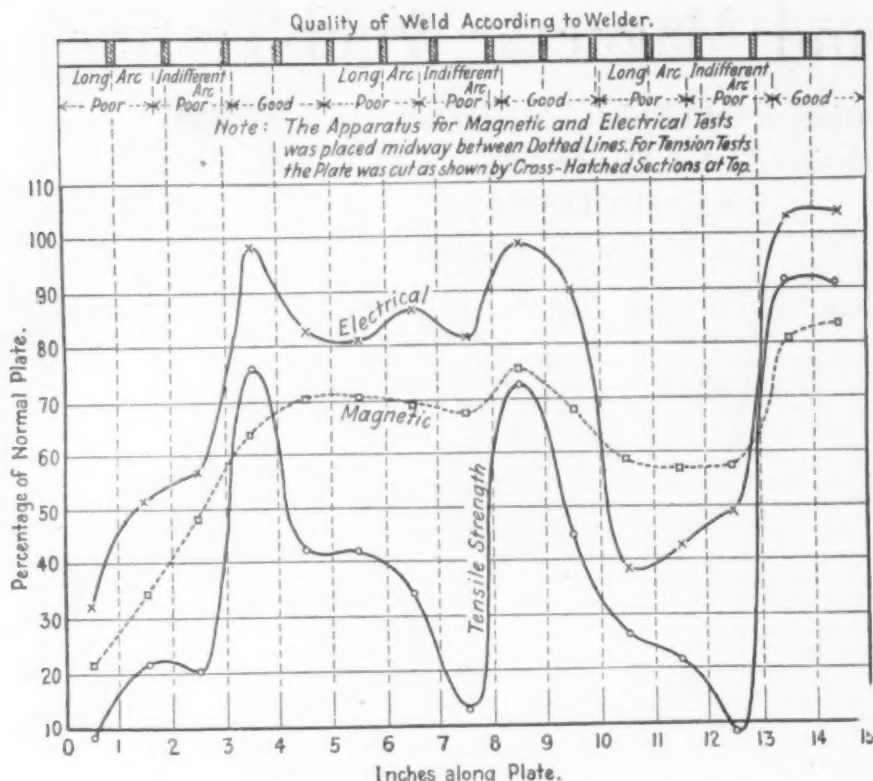


Fig. 3.—Plotted Results of Electrical, Magnetic and Tension Tests, Plate A

tial contacts from the plate a slight distance with some non-magnetic material. This was done to equalize the effects of scale and non-uniform contacts. Due to the fact that, in some cases, the plates were badly bent and twisted, better results were also obtained by rounding the main contacts at *a* and *b*. It is necessary for proper functioning that the potential posts *c*, *c*, and *c* be symmetrically spaced in respect to each other and to the magnet cores *a* and *b*.

In the magnetic test, readings were taken along the plate at 1-in. intervals as in the electrical tests. The quality of the weld is expressed as in the electrical tests.

**Tension Tests.**—After completing the electrical and magnetic tests, the plates were cut into 1-in. strips at right angles to the weld and the tensile strength of the strips determined. The cross-section was taken equal to that of the normal plate outside the weld. In most cases rupture occurred within the weld, but in a few instances the strip broke outside, showing that the weld was stronger than the plate. In all cases an average value was obtained for the strength of material in the plate so that the strength of the weld could be expressed as a percentage of that of the plate.

#### Test Results

The electrical and magnetic test results for the various plates, together with the quality as reported by the welder, are shown in Figs. 3 to 6. The electrical and magnetic testing apparatus was located midway between each pair of vertical dotted lines as indicated by the test points. For the tensile tests the plates were supposed to have been cut along the dotted lines. The machining was not accurately done, however, as indicated by the cross-hatched portions at the top of the figures which show the actual cutting positions. The results shown for the electrical and magnetic tests represent data obtained after a good many trials and check runs which were in some cases made on both sides of the plate. A weld equal in quality to the plate is represented as 100 per cent. For points below the 100 per cent

line, the weld is poorer than the plate and above, better.

#### Discussion of Results

Before considering the results on each plate in detail the following points may be noted. In comparing the electrical and magnetic tests with tensile strength we must make allowance for the fact that the latter tests were made on isolated strips and represent absolute values, while in the former tests adjacent strips have an influence on the value read. Although this does not prevent the electrical or magnetic testing from showing up isolated bad spots, it may modify them or slightly displace their apparent position since the measurements could not be completely localized. If a good and bad spot are adjacent, the electrical and magnetic tests will give a more or less mean value, whereas the tension test, which is the absolute test value for one inch, is not of course influenced by the adjacent material, since this material has been removed. Moreover, the tension tests tend to be too low as compared with the quality

of the completed weld for two reasons:

1. In many cases the two plates welded were no longer in the same plane due to shrinkage caused by unequal cooling and therefore tension tests produced bending strains as well as normal strains; and
2. If a small slag inclusion or other weak spot was present near the edge of a strip it would tend to spread on pulling, thus reducing the strength of the strips below that to be expected of the completed weld.

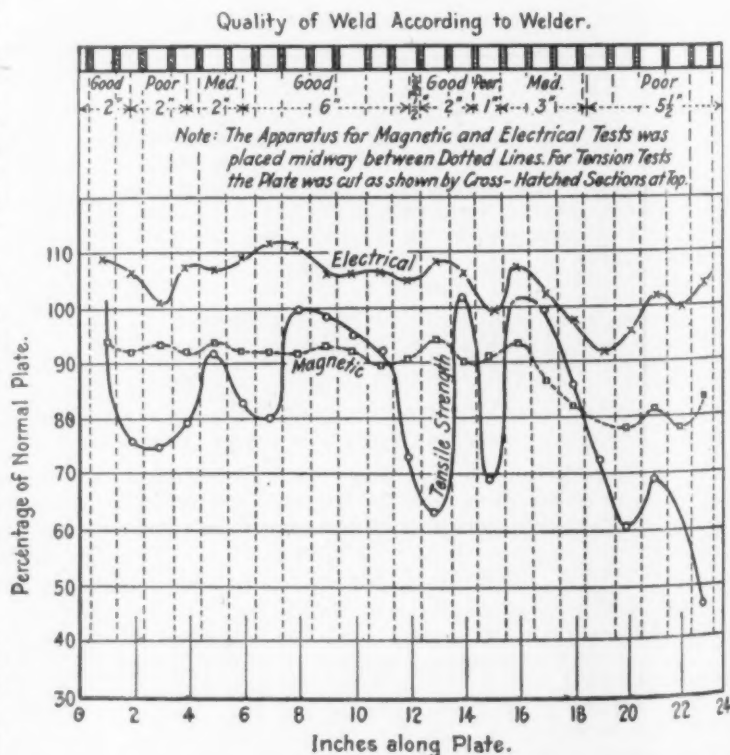


Fig. 4.—According to the Magnetic Test on This Plate (Plate B) It Would Be Pronounced a Good Weld with the Exception of the End, 18 to 24 In. There are evidently some isolated bad spots at some other points, but these are not sufficiently bad to have much effect on the magnetic data. The electrical test in general shows much the same results as the magnetic. In general we would say that this was the best plate of the four, but that the detail of variations was not brought out very well by either of the two tests

It is probable, then, that the tension tests represent a worse condition than actually existed. Moreover, it is quite possible that the electrical and magnetic results more nearly represent the true quality of the weld as a whole, although they probably indicate a weld quality somewhat superior to the actual quality.

**Plate A.**—This plate was tested a large number of times by both methods. As shown by the curves (Fig. 3) the electrical test follows the tensile strength more closely than the magnetic test does. The latter, though, indicates that the weld is very bad in almost every part. The bad region between the 5 and 8-in. points is somewhat slighted by both tests, although it is not shown as "good" by either one. The good spot between the 3 and 4-in. points is shown by the electrical test but not by the magnetic. It is probable that an isolated good spot will not be picked out by the magnetic test, but the results seem to show that isolated bad spots are readily located, which is presumably more important. It will be well to call attention to the fact that in testing this plate the magnetic tester had not been developed to the working efficiency that was reached later. Therefore, there is a possibility that the poor 5 to 8-in. section would have been better detected had it been tested under the later conditions of test. This plate had the poorest welding of the four, which is shown by all the tests.

### Conclusions

1. It would seem that the foregoing tests will pick out faults in welds irrespective of what type they may be. For instance, it was brought out by an examination of the test strips that a small cross-section at the weld shows up magnetically. On the other hand if there is a surplus of metal at the weld and part of it poor, this condition is detected.

2. From the experimental work here reported it seems that the magnetic methods give the more con-

sistent results.

3. For butt-welding it is quite feasible to definitely state from the magnetic test whether a weld is good, fair or poor when the results are properly interpreted.

4. While the electrical or magnetic tests do not detect small isolated bad spots with certainty, a fairly poor weld extending over considerable distance will be indicated without the slightest possibility of doubt.

5. It is apparent that the tension tests indicate much poorer quality of welds than the magnetic or electrical. However, from considerations mentioned above we believe that the tension tests indicate a poorer quality than actually exists, while the electrical and magnetic tests show more nearly the average quality.

6. All of the welds with the exception of plate A, Fig. 3, would be considered good average welds. For this plate, the tension, magnetic and electrical tests all agree that this is a poor weld.

7. It should be possible to readily devise a simple and portable apparatus for applying these methods, especially the magnetic, for commercial weld testing. The magnetic method should be more readily applicable since actual metallic contact between the testing apparatus and plate is not essential.

8. These results open up a line of approach to weld testing in general. It remains to be seen whether the foregoing methods can be successfully applied to lap-welded joints and other untried forms. The application to butt welding alone should be quite important to any industry that utilizes this type of weld extensively.

A. L. Flint, general purchasing officer, the Panama Canal, Washington, will receive bids until July 25, for a quantity of metals and miscellaneous equipment.

Quality of Weld According to Welder.

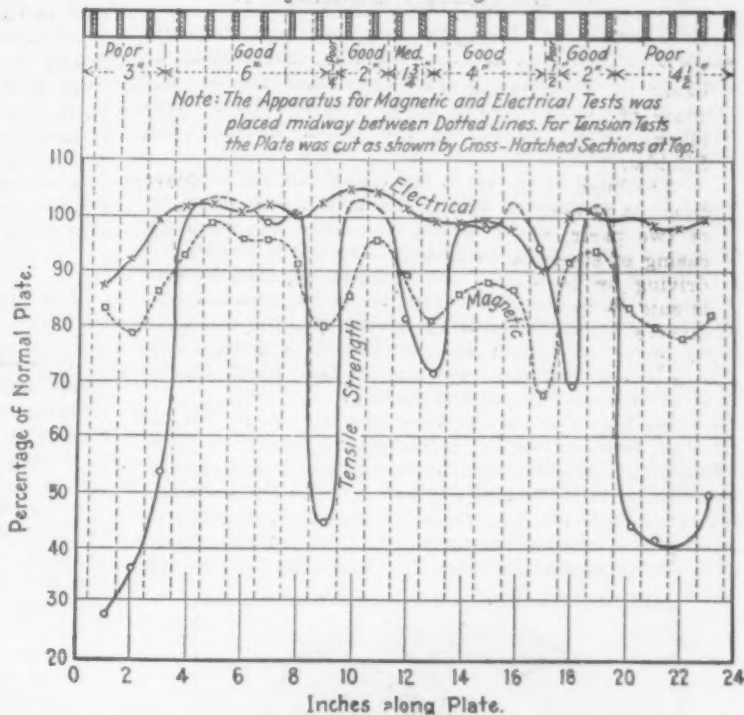


Fig. 5.—The Magnetic Test on Plate C Seems to Follow the Tensile Strength Remarkably Well, Although the Magnitude of the Percentages Are Somewhat Different, as Would Be Expected. The strip at 17 in. shows a bad spot magnetically, while in the tension test this bad spot seemed to be located at 18 in. However, according to the data on the original welding there was a bad spot located at 17 in. and it is probable that it extended into the 18-in. region. On account of the adjacent good weld at 19 in. the effect of the bad spot was more prominent at 17 than at 18 in. The electrical test on this plate was not so successful and shows a uniformly good plate with the exception of the strip at 17 in. and the section from 1 to 3 in.

Quality of Weld According to Welder.

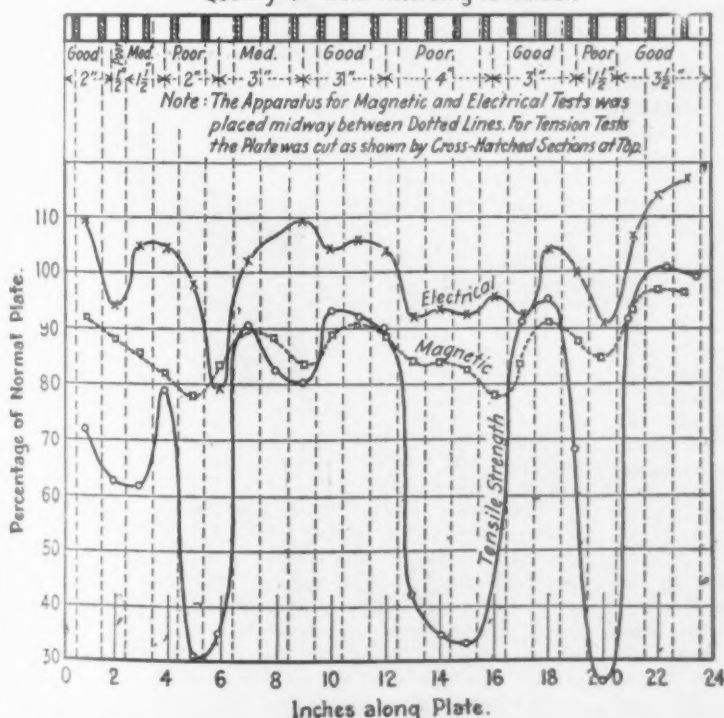


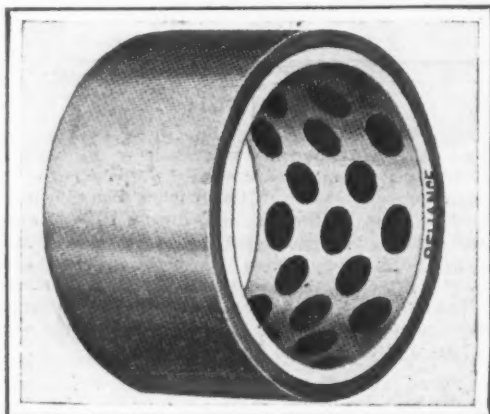
Fig. 6.—Again in This Plate (Plate D) the Magnetic Test Follows the Shape of the Tensile Strength Curve Quite Closely. The electrical test also shows quite good results, although the latter is displaced above the 100 per cent line too much. The bad spots in the plate are quite definitely picked out by both tests.

### Self-Lubricating Bushings

Self-lubricating bushings and bearings for use where oiled bearings are objectionable, inaccessible, or likely to be forgotten, and recommended for use because of the comparatively lower cost and their durability, are being offered by the Union Machine Co., Fitchburg, Mass.

The bushing is shown in the accompanying illustration. It is designated as the Reliance and is made up of two parts, an inner casing of bronze and an outer casing of steel tubing machined to standard sizes for a driving or pressing fit. The method of manufacture is said to be a departure from the usual practice and involve fewer manufacturing operations, the bushings being machined, filled and burnished without being split. If required the outer casing may be of bronze or of steel, tinned to prevent rusting.

Holes that contain the lubricant are  $\frac{1}{4}$  in. for all sizes of bushing, which is intended to assure a large lubricating surface irrespective of the dimensions of wearing parts. The shaft or pin holes in the bushings for sheave and block work are larger than listed sizes to allow for running tolerance. The bushings are made with the requisite allowance for a driving fit into the



The Inner Casing Is of Bronze and the Outer of Steel Tubing. The bushings are machined, filled and burnished without being split

holes bored to the exact size usually given as the outside diameter of the bushings. They are available in any length and with any special inside or outside diameters required, also flange bushings of all standard sizes.

The inner casing wall is  $\frac{3}{32}$  in. Instead of straight, tapered holes are bored, these being slightly larger on the outside than the inside, which is intended to furnish a grip for the lubricant mixture and eliminate possibility of its dropping from place. The nature of the inner casing and the patented process used is said to permit of great compression in placing the lubricant plugs, the plugs being made directly inside the hole and under great pressure. In the event of the lubricant wearing below the point of usefulness a new inner casing can be inserted. The thickness of the outer casing can be made to meet requirements, and bushings can be furnished without outer casings.

A test shaft 1 in. in diameter with bearings 5 in. long, is said to have been run continuously for 150 hours at a speed of 4700 r.p.m., the bushings being after the test in practically the same condition as when started.

### British Empire Steel Corporation Additions

In connection with the additions to be made to the plant of the British Empire Steel Corporation, Sydney, N. S., to cost \$19,000,000, it is stated that the company's engineers are now preparing plans for new open hearths and a blooming mill which will cost about \$10,000,000. One blast furnace is to be rebuilt and another extensively repaired, while a number of other additions and improvements will also be made to the plant. It is reported that the money to pay for these improvements is to come from a large loan to be made to the British Empire Steel Corporation by two large

American financial houses, the negotiations for the loan being nearly completed.

According to information furnished by the head office of the British Empire Steel Corporation, at Montreal Que., one open-hearth furnace at the Sydney, N. S., plant was blown in on July 10. This company's business has been improving for the past three months, and everything points to continued improvement. It is also stated that the company's pay roll amounts to \$10,000 per day, this being the first time since November, 1920, that the payroll has reached this amount.

### Lectures on Geology of Commerce and Industry

A series of evening lectures on the geology of commerce and industry has been announced by New York University. They will be given at the Washington Square division of the school of commerce by Ernest R. Lilley, consulting geologist and mineral economist, and lecturer on economic geology. The fall term will cover commercial geology of the fuels, chemicals, and building materials. The spring term will treat of the problems of the metal industries. The subjects include the mining and preparation of iron and steel; world problems in iron ore conservation and utilization; the major alloy bases, manganese, chromium; economics of the minor alloy ores, tungsten, molybdenum, vanadium; process materials of the metal industries, including refractories and abrasives; non-ferrous metals. The lectures will be given at the Washington Square Building, New York University, on Wednesdays from 8 to 9.45 p. m. beginning Sept. 27, 1922. For information the secretary of school of commerce should be addressed at Washington Square, New York.

### Electric Space Heater for Various Uses

An electric device called a space heater and having a wide field of application, has been placed on the market by the Westinghouse Electric & Mfg. Co., East Pittsburgh. It is adaptable to heating metal, water tanks, baking and drying ovens, drying of foundry molds, warming crane cabs, and in other uses where the temperature required does not exceed 800 deg. Fahr. The device is available in many sizes and in several wattages and voltages.

Ease of application, adaptability to any heating pur-



Electric Space Heater for Use Where the Temperature Required Does Not Exceed 800 Deg. Fahr. Electrical connections are insulated from the supports

pose, rugged construction, convenient lengths and durability of the heating element are said to make the heater particularly useful for industrial applications.

The heater shown in the illustration is made up of a sheet-steel outer casing which forms the sheath and also has the supporting holes. The back is flat and the terminals project from one side only, the terminal supports being permanently attached to the casing. Electrical connections are insulated from the supports, which adapts the heater for attachment directly to plates, tanks and other metals without the danger of short circuiting or grounding the terminals.

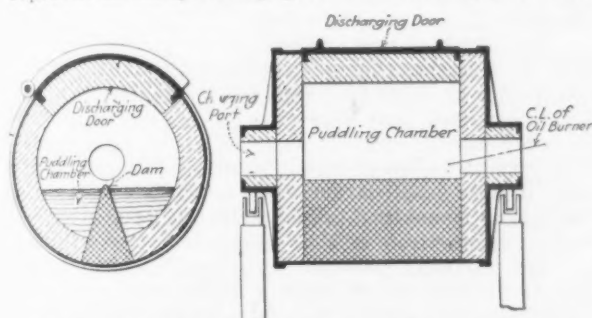
For general air heating purposes, such as warming of isolated rooms, booths, etc., the heaters may be fastened on angle iron frames and protected by screening. For heating metal tanks, pipes, etc., the device is fastened against the surface and insulated.

# New Process for Mechanical Puddling

Commercial Installation at the Titan Works Consisting of Cupola and Ten Furnaces—Repeated Pourings Over a Dam the Unique Principle of the New Method

HAVING demonstrated, through an experimental outfit, that mechanically puddled wrought iron is a commercial possibility, the Titan Iron & Steel Co., Inc., Newark, N. J., is about to install a complete unit consisting of a large cupola, ten mechanical puddling furnaces and a mechanical squeezer for handling the large balls. One of the furnaces is already in position and the squeezer is also in commission. In connection with the new equipment will be a roll train for breaking down the puddled bar into billets and a finishing train for the production, from the billets, of merchant bars and skelp and various types of rods. The whole will be installed in the company's plant in Newark.

Two or three hundred heats of iron have already been made in the experimental furnace, with results reported as exceptionally good. The four photomicro-



Mechanical Puddling Furnace with Dam for Producing Intimate Mixture and Homogeneous Iron. The molten pig iron is introduced through the hollow trunnion at left and the fuel oil through that at right. Products of combustion pass out through the charging port at left. When the ball is ready, the door at top is opened and the ball drops out

graphs shown are taken from some of the iron produced by this process. These photomicrographs were made by Prof. Albert Sauveur, of Harvard University, all being magnified 100 diameters and then reduced one-half in reproduction.

The unique principle of the process, which is the invention of Henry D. Hibbard, is in making a charge of molten iron and oxide of iron pour repeatedly over a dam. An intimate mixture of the two ensues, with a rapid change of the iron to the wrought state. The presence of this dam causes the material to spill over the top in a thin stream as the furnace is oscillated back and forth in operation. This makes for thorough mechanical mixing and goes far to explain the homogeneity reported in the product.

The melting stage is carried on in a cupola, as considerably less expensive than melting in the puddling furnace. Molten iron goes into the furnace through one hollow trunnion (the oil fuel is introduced through the other trunnion) and the purifying, boiling and balling stages take place within the furnace. In all three of these the operation, mechanically, follows the hand method, both in the chemical and physical aspects. The carbon is removed, just as in the hand method, during the boiling process, while in the balling process the plastic grains unite and form the sponge. A mixture of gray forge pig iron and scale is used. The chemical reactions, which eliminate practically all the non-ferrous ingredients of the crude iron and change it into wrought iron, are these:

The silicon is wholly oxidized and enters the slag as silicic acid ( $\text{SiO}_2$ ).

The manganese is wholly oxidized and enters the slag as oxide ( $\text{MnO}$ ).

The phosphorus is oxidized to the extent of 80 to 90

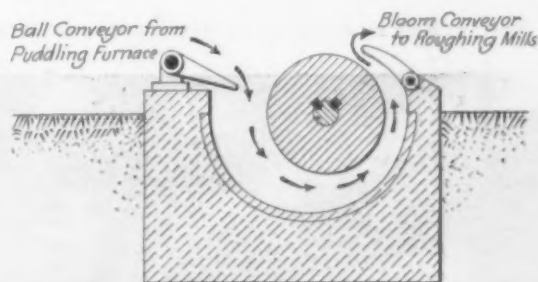
per cent, and enters the slag as phosphoric acid ( $\text{P}_2\text{O}_5$ ).

The sulphur to the extent of 70 to 90 per cent leaves the iron and enters the slag probably as sulphide of manganese or sulphide of iron.

The carbon is almost wholly oxidized and leaves the metal as carbonic oxide gas ( $\text{CO}$ ) with less than 0.10 per cent of carbon remaining in the rolled bar.

Essentially, the furnace consists of a cylinder of steel plate about 6 ft. in diameter and 5 ft. 6 in. long, with projecting trunnions 18 in. in diameter. The cylinder is lined with magnesite brick to an inside diameter of about 4 ft. The dam, which consists also of magnesite brick, extends up nearly to the center line. On the surface of the brick a skim of iron is sintered to perhaps  $\frac{1}{2}$  in. As this protects the brick both from mechanical damage and from the action of the hot metal, the refractory situation is reported as not causing trouble. The operation is carried on at a temperature of about 2650 deg. Fahr., the flame being 2850 deg. As soon as the iron "comes to nature" and begins to form into a ball, the oscillating motion of the furnace is stopped and it is rotated clear over. Eventually the door, which normally is at the top of the furnace, is opened, and out of this door the balls drop upon a conveyor.

From the conveyor the ball is carried to the squeezer (which was designed in the plant and built by contract) where it goes down through a passage of continually decreasing dimension and whence it is expelled in rough cylindrical form at the far side, freed from surplus slag, and prepared for the breaking down rolls. The squeezer is made of steel castings, the rotating corrugated drum having a diameter of approximately 4 ft. So long as the corrugations hold their shape, it is felt that no need will exist for special projecting points to carry the ball through the machine.



Rotary Squeezer for Converting the Puddled Ball into a Bloom for the Roughing Rolls. The arrows show course of ball. The axis of the corrugated drum is horizontal

Arrangements have been made, however, so that these points may be fitted as needed.

Each puddling furnace has a capacity of 1200 lb. or more per heat. The largest heat which has been taken out weighed 1340 lb. It is claimed that this particular ball is the heaviest which has ever passed through a squeezer. The one squeezer will do for the ten furnaces, because the ball is in the squeezer only about 45 sec. The squeezer is operated by an electric motor of 250 hp., but this is reported to be about double the actual requirements. The motor is geared into an intermediate shaft carrying a flywheel; from this shaft spur gearing further reduces the speed for the squeezer roll. Thus there is a double reduction from the speed of the motor to that of the squeezer.

Some of the physical and chemical results obtained from this iron are shown in the table. The iron is used largely for pipe and sockets, for engine bolts, stay bolts and high grade merchant bar. It is reported that

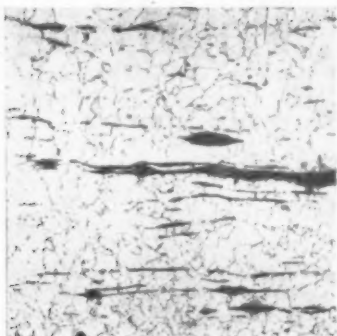


Fig. 1

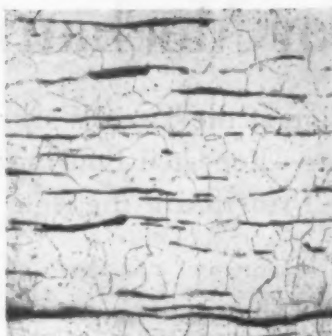


Fig. 2

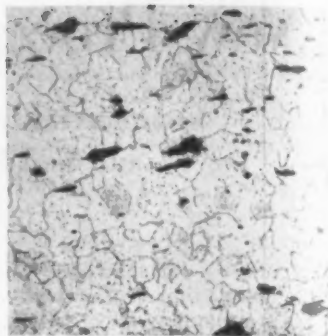


Fig. 3

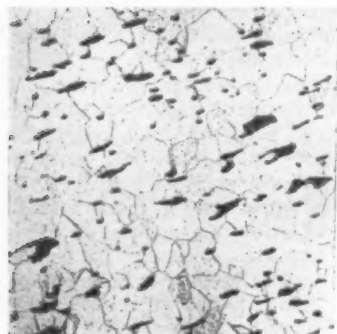


Fig. 4

Photomicrographs of Mechanically Puddled Wrought Iron. Figs. 1 and 2 are longitudinal sections; Figs. 3 and 4 are cross sections. All magnified 100 diameters, and reduced one-half

the chemical analysis presents great uniformity from one heat to another.

	Pipe and Socket Iron	Stay Bolts and Merchant Bar
Carbon, per cent.....	0.022	0.030
Manganese, per cent.....	0.031	0.022
Silicon, per cent.....	0.220	0.200
Phosphorus, per cent.....	0.128	0.042
Sulphur, per cent.....	0.025	0.013
Tensile strength, from... 45,000 lb.		48,000 lb.
to..... 50,000 lb.		52,000 lb.
Yield point, from..... 25,000 lb.		26,000 lb.
to..... 30,000 lb.		32,000 lb.
Elongation, per cent (in 8 in.) .....	15 to 20	25 to 30

The building in which the operations are now carried

on includes three bays about 50 x 400 ft., equipped with electric cranes, and one area about 200 ft. square without cranes. One bay contains four open-hearth furnaces, three being stationary 30-ton units, while the other is a tilting furnace of about 25 tons capacity. These furnaces, not now in use, are reserved for possible future operation. The new cupola, of continuous type, will have a 72-in. diameter shell, but will be lined at first to 60 in. diameter. It will be located alongside the open-hearth charging platform and will be charged from that platform, as are the two small cupolas now in use.

It is expected that the new cupola and ten furnaces will be in position by the middle of September, giving a capacity of about 5000 tons per month. The plant is to be extended next year to a capacity of about 7500 tons per month, which is regarded as the maximum for the present buildings and land area. It is planned to install later a still larger plant somewhere west of the Allegheny mountains, taking advantage of proximity to blast furnace iron in that district.

The Hibbard process, which was originally contrived for refining or washing crude iron, is patented throughout the world. Several additional patents have been applied for and are pending and negotiations are in progress for the establishment of the process in nearly all iron-making countries. The Hibbard Process Corporation, 71 Broadway, New York, has been organized, of which Henry D. Hibbard is president, Charles F. Rand, vice-president and C. Ames Brooks, secretary and treasurer.

Robert E. Jennings, 2nd., formerly vice-president



Mechanical Puddler in Operation in Middle Distance, with Flame Issuing from Charging Port at Right. Farther to right is the charging spout for cupola iron. In foreground is the rotary squeezer which compresses the puddled ball into a rough cylinder for passage through the breaking down rolls

and general manager of the Hewitt Steel Corporation, is president of the Titan Iron & Steel Co., Inc. W. W. Williams, vice-president, was formerly general manager of the A. M. Byers Co. and vice-president and

general manager of the Reading Iron Co. Louis M. Atha is treasurer. E. F. Blessing, works manager, was formerly chief metallurgist of the Reading Iron Co.

## SHIPBUILDING SHOWS DECLINE

### Production of Ships Throughout the World Now Below Pre-War Level

World shipbuilding to-day is actually below the pre-war level, says a statement by Lloyd's Register of Shipping. The decrease in production has been steady since the fall of 1919, and the volume of new orders continues to be far below the completion of orders in hand.

While the returns for the quarter ended July 1 show that the aggregate of contracts in hand is nearly 800,000 gross tons more than the total at July 1, 1914, so many suspensions of work have been directed by those who placed the orders that the actual volume of construction actively under way is slightly below the pre-war figure. On April 1 the American aggregate was lower than before the war, but on July 1 it was slightly above the pre-war figure. This country, however, was practically the only one in the world to show a gain during the past quarter.

The gross aggregate of tonnage on July 1, as compared with the previous quarter, was as follows (in gross tons):

	July 1	April 1
United States .....	150,623	136,266
United Kingdom .....	1,919,504	2,235,998
Other countries .....	1,165,303	1,307,358
World total .....	3,235,430	3,679,622

### British Work Drops Off

Stoppages ordered on this work fell more heavily on British shipyards than on those of all the other maritime nations combined, says Lloyd's Register, the result being that, while the actual British total is nearly 300,000 tons below the pre-war figure, the aggregate of the other shipbuilding countries is about 250,000 tons higher than in 1914. The following shows the result of the last quarter's suspensions, in gross tons:

	Britain	Others
Work contracted .....	1,919,504	1,315,926
Less suspensions .....	481,000	290,000
Actual work .....	1,438,504	1,025,926

The actual construction under way at present, as compared with that just before the war, shows how British shipyards have been affected:

	July 1, 1914	July 1, 1922
United Kingdom .....	1,722,000	1,438,504
United States .....	148,000	150,623
Other countries .....	626,000	875,303
World total .....	2,496,000	2,464,430

The world construction now actually under way shows a decline of nearly 5,600,000 gross tons from the peak, which was attained in September, 1919, when 8,048,000 tons were being built. This country's present total of 150,000 tons, compared with the high level of 4,186,000 tons reached in the first quarter of 1919, shows a decrease of more than 95 per cent. It is interesting to note that the relative proportions of the world's shipbuilding have changed considerably since the pre-war period. Great Britain, which then had 69 per cent of the total, now has only 58 per cent; the United States has still its 6 per cent as in 1914, and the other countries have increased their share from 25 per cent to 36 per cent.

Returns from all countries of the construction being done under the supervision of Lloyd's Register and intended to be classed with that society, show a total of 2,010,912 gross tons, of which 1,470,977 tons represent orders placed in Great Britain.

The total of work now under way in German shipyards is estimated by Lloyd's Register to be 500,000

gross tons, or over 200,000 tons more than for any other country in the world except Great Britain. Danzig is reported to be building 45,000 tons of merchant ships.

Of the smaller shipbuilding countries, Italy, France and Holland still retain their lead, in the order named. All, however, show declines from their figures for the quarter ended April 1. Of the smaller ship-producing nations, it is to be noted that Japan shows the least decline, her decrease being only 1800 tons from the April figure.

### Proposed Iron and Steel Freight Rates Suspended

WASHINGTON, July 18.—The Interstate Commerce Commission last Saturday entered an order suspending from July 15 until Nov. 12, unless otherwise ordered, the operation of the tariff supplement establishing a proportional rate of 20c. per 100 lb. on iron and steel articles in carloads from New Orleans, Baton Rouge, and Anchorage, La., to the Galveston, Houston, Beaumont and Orange groups in Texas. In the meantime a hearing on the proposed reduction in the rate will be held. This case has created considerable interest in the iron and steel trade, as well as among the affected railroads, as pointed out in THE IRON AGE of last week, page 96. Chicago and St. Louis steel makers oppose the proposed proportional rate of 20c., while steel producers in the Pittsburgh and surrounding districts had asked the commission to allow the rate to become effective on July 15, as proposed by Agent Leland, who filed the tariff, on behalf of southwestern rail lines.

The following table illustrates the proposed changes:

Rates are in cents per 100 lb.				
From New Orleans to Galveston, Tex....	On Bars, Angles and Fence Material		On Pipe and Fittings	
	Present	Proposed	Present	Proposed
Houston, Tex....	57.5	*20 †38	.33	*20 †33

\*Applies only on traffic originating beyond other than import traffic. †Applies on local traffic.

### Large Magnesite Deposit in Southern Nevada

A massive deposit of magnesite of unusual character that has recently been brought to the attention of the U. S. Geological Survey promises to yield a large and readily available supply. The deposit lies in Clark county, Nev., a few miles above St. Thomas. The material has been known for some time as kaolin, and successful experiments for utilizing it as a porcelain clay are reported to have been made, though they have not yet resulted in the exploitation of the deposit.

The so-called kaolin is stated by the geological survey to be in fact a magnesite. The material is porcelain-white, fine grained, and massive, is remarkably free from foreign material, and has the structureless appearance and conchoidal fracture that are generally characteristic of magnesite. It is not so hard as the more typical magnesite, and it crumbles more rapidly on exposure to the weather. Unlike most other deposits of magnesite in California and elsewhere in this country, this is not a vein deposit, such as occurs with serpentine, but resembles closely the deposits discovered in 1911 at Bissell siding, near Mojave, Cal. The deposit at Bissell, however, does not appear to be so large or regular as the deposit on Muddy River.

Sales of leather belting in the week ending July 1, as reported by the Leather Belting Exchange, representing about 60 per cent of the total product, were 105,168 lb., valued at \$167,532. For the preceding week they were 89,312 lb., valued at \$146,204, and for the corresponding week in 1921 they were 72,408 lb., valued at \$120,560.

## TOOL FOR TURNING DOWN NUTS

### Electric Machines Intended to Shorten Operations —Special Features Outlined

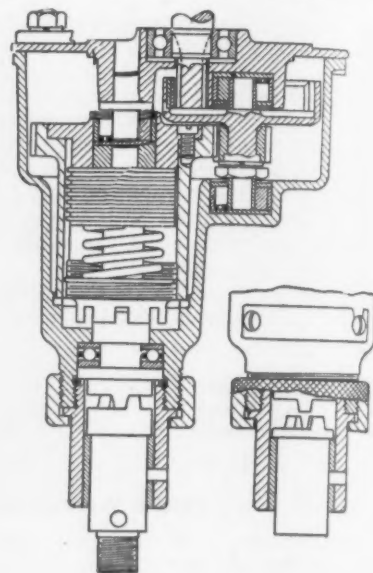
An electric tool designed for turning down nuts, cap screws, wood screws, studs and similar fastenings and arranged to operate in either direction, has been placed on the market by the Elecdrive Mfg. Co., Inc., Syracuse. It is intended to shorten the operations of starting by hand, driving and setting nuts or screws and can be used on left-hand threads or for turning-off nuts, screws and the other fastenings.

At present the machine is made in three sizes, two portable and one stationary type. The portable tool as shown in the illustration resembles in general outline the ordinary electric drill. The stationary type is

and are said to be of exceptionally high speed for universal motors, operating through a set of reduction gears with a ratio of 10 to 1.

Both the portable and stationary types are equipped with wrenches of special design, recessed and tapered to permit nuts to be picked from the bench while the tool is running at full speed. The nut or screw is held in the wrench so that its axis is true with the driving spindle of the machine and can be started on the thread without danger of cross threading.

The driving spindle of the machine rotates at 1000 r.p.m. while the nut or screw is being driven down, excepting the fraction of a turn necessary for the actual setting. The spindle then decreases in speed gradually until during the actual setting-up operation it is rotating at only approximately 350 r.p.m. The driving spindle of the smallest tool develops when driving nuts or cap screws from 10 to 12 foot-pound torque, the

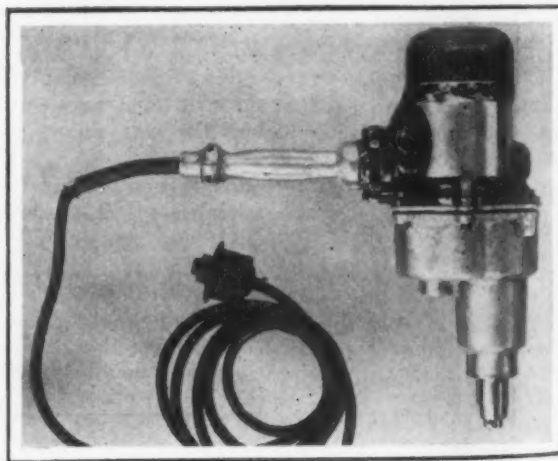


Electric Tool for Turning Down Nuts and Screws. The stationary type is shown in operation at the left, and the portable machine below. The arrangement of the mechanism is shown in the view above

shown in the separate illustration, and represents a departure from the usual design of nut or screw driving machine.

The driving mechanism of the tool is the patented feature and incorporates a multiple-disk slip clutch, adjustable for any tension within the capacity of the motor and operating through a spline shaft to a positive clutch. The arrangement is such that the positive clutch automatically "kicks out" when the disk clutch fully releases. While the positive clutch is kicked out or disengaged, the driving spindle is relieved from torque and is free. This feature permits the removing of the wrench, chuck or screwdriver from the driven member and their engagement with a new member while the motor is running at full speed. The slip clutch requires that all nuts or screws be driven to the same tension and also prevents any shock reaching the motor. Because the clutch cannot be tightened to a degree that will stall the motor, the motor cannot be overloaded or burned out. Setting up of the nuts or screws slowly is a feature of the clutch arrangement and it is emphasized by the makers that without the clutch arrangement provided, threads would be stripped, the bolt strained or the tool damaged.

The portable tool operates from an electric light socket on either direct or alternating current at 110 volts, where the frequency does not exceed 60. The stationary type is usually connected to a power line, but where a large margin of safety has been used on the lighting circuit, the tool may be connected to a socket. The stationary type is also a universal motor and can be used on any circuit up to 60 cycle. The motors employed are of special design for the work done



larger portable tool developing from 12 to 14 foot-pound torque and the stationary tool setting nuts or cap screws that require 65 foot-pound torque.

The reversing control mechanism is unique and has been designed for this type of motor only. The motor can be thrown from direct motion into reverse only after the current has been broken. The stationary type can be equipped with a hopper to handle double chamfered nuts, cap screws, wood screws, and other types. When the hopper is used the speed of the machine is greatly increased and in experimental work, 32,  $\frac{3}{8}$ -in. nuts are said to have been started, driven and set in one minute.

# Progress in the Open-Hearth Process\*

## Some Results from the Blow Torch Furnace—Its Principles and Advantages — Steel Encased Regenerators

BY WILLIS MCKEE

UNTIL the last couple of years probably no process in the steel-making industry progressed less since its introduction than the making of steel in the open-hearth furnace. From the building of the first successful furnace in this country, a little more than 50 years ago, there had been no basic change in open-hearth construction. It is true that during this time the units had become larger and more substantially built; the facilities for handling the materials to and from the furnaces had become much more satisfactory; improved valves had been invented; water-cooled ports, doors, door frames and buckstays had been employed and slag-line coolers had been installed; but the time of the making of the heat had remained approximately the same, the fuel economies had been improved but little and the operation of the furnace was no more under the control of the operator than a half century ago. The problem of satisfactory refractories is still unsolved, although this phase is now receiving most intensive study and consideration. The operation of the units is intermittent, shutdowns being necessitated every few weeks for repairs to the brick work.

### Heat Balanced

About 10 years ago a careful test was run at the Homestead works of the Carnegie Steel Co. to determine the heat balance of the open-hearth furnaces. The furnace used in the test made an average heat of 54.6 tons; natural gas was used as fuel. This test was run for seven or eight months. The results proved that the losses due to the temperature of the escaping gases, radiation, conduction and other causes amounted to 95.77 per cent of the heat units supplied by the combustion of the incoming fuel. This brings us to the startling conclusion that if we could eliminate all such losses that there would be only about 20 to 30 lb. of coal required per ton of steel produced. It is not to be expected that any such efficiency can be obtained, but it is time that careful thought be given to the saving of our fuel supplies and to the lowering of the cost of steelmaking by their more economical use.

In the last 10 years, the use of water-cooled devices has had a tendency to stabilize the operation of the furnaces, but excessive use of water of course decreases the thermal efficiency of the furnace, so that the use of such equipment must not be carried to excess. The use of waste heat boilers has materially decreased the heat losses but at a considerable cost of installation. The fact that the stack losses are great enough to justify the installation of waste heat boilers helps us to realize the inefficiency of the process.

### Efficiency and Poor Combustion

The greatest cause of the low efficiency is imperfect or delayed combustion. It has been customary to introduce the gas into the hearth in a semicircular port at about  $\frac{1}{2}$  to 1-in. pressure and to introduce the air around it at a pressure which is created by the column of heated air from the bottom of the checkers to the top of the uptake. Although it was early appreciated that it was necessary, in order to obtain the temperature required in the open-hearth furnace, to preheat both the gas and air to as high a temperature as possible, no attempt appears to have been made to see that the gas and air were intimately mixed with the result that although some particles of air and gas mixed promptly at the end of the port and combustion

started quickly, other particles of air never came in contact with the gas until reaching the other end of the hearth and frequently not until they had reached the slag pockets or regenerator chambers in the outgoing end of the furnace.

This delayed combustion not only decreases the thermal efficiency of the furnace and lengthens the time required for a heat, but it causes needless destruction of the uptakes, slag pockets and regenerators. In order to insure combustion it has been customary to supply additional air, which, of course, decreases the thermal efficiency. In the test previously mentioned, it was found that 150 per cent excess air was actually being used. If such excess is maintained while conducting a test, it is to be assumed that under normal conditions, even worse practice prevails.

Only about three years ago it was first proposed to mix the fuel and air before they entered the hearth of the furnace so as to obtain complete combustion promptly. This is an application of the Bunsen burner or blow torch principle which was invented some 65 years ago with the exception that the Bunsen burner insures against burning in the mixing chamber by having the velocity of the gases such that the flames cannot travel back into the mixing chamber. In an open-hearth furnace the temperature of the gases coming from the regenerators is so high that the flame is initiated as soon as the gases come in contact with each other. It is, therefore, necessary in order to use this principle to cause the gases to travel at such a velocity that there will not be enough combustion in the port to raise the temperature to such a point as to cause rapid destruction of the port.

[The author discusses by means of drawings the principles of the Egler furnace. This furnace was described in THE IRON AGE, June 2, 1921.]

### Requirements of Blow-Torch Furnace

After a careful study of the requirements of a successful blow torch or Bunsen burner installation, it has been found that the following conditions must be met:

When using producer gas it is necessary to so introduce the air and gas that excessive gas house pressure will not be required. In other words, if over  $1\frac{1}{2}$ -in. air pressure is used (and a higher pressure has been found desirable) it is necessary to aspirate the gas so that the proper amount of gas can be introduced without necessitating a gas house pressure in excess of 2 in.

It is necessary to insure a perfect mixture of the gas and air before they issue from the port.

It is necessary to properly direct the flame so that it will impinge sharply upon the bath so as to not only obtain full benefit of the blow torch flame but to prevent it coming in contact with the brick work.

Adequate outlet ports must be provided to carry off the products of combustion.

These conditions are fully met in the construction shown. The combined port is long enough not only to thoroughly mix the gas and air but to properly direct the flame upon the bath. The velocity of the gases is such as to avoid excessive combustion in the port. The ports are exterior of the furnace, that is, the brick work forming the port is not subject to the high temperature of the furnace on both sides. This greatly lengthens the life of the ports. The valve arrangement is simple and not liable to get out of order due to expansion and contraction of the brickwork.

In the operation of a furnace this description at the plant of the Brier Hill Steel Co., Youngstown, using natural gas, 9111 tons of high grade basic open-hearth steel were made in 31 days, with a charge consisting of 65 per cent heavy melting scrap, 6 per cent cold pig

\*From a paper presented at the annual convention of the American Foundrymen's Association at Rochester, N. Y., June 4 to 9. The author is connected with Arthur G. McKee & Co., Cleveland, engineers.

iron and 29 per cent hot metal. The best tonnage ever made in this plant on a furnace using ordinary method of construction was 6344 tons, and this record was made when using a mix of 45 per cent scrap and 55 per cent hot metal. The average monthly output per furnace of this plant operating on approximately 45 per cent scrap is 5000 tons per month.

On account of the short, sharp, blow torch flame the gases attain their highest temperature and combustion is completed before they reach the middle of the hearth. From this point their temperature drops

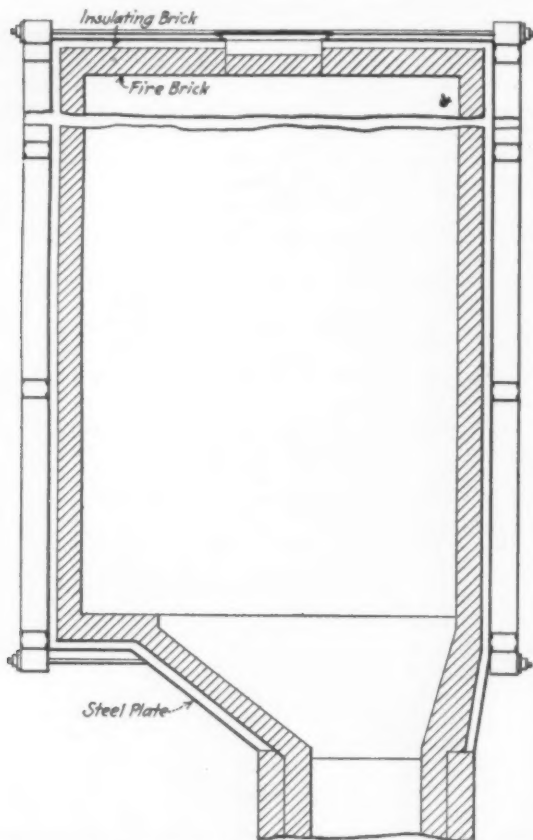


Fig. 1.—Steel Encased Insulated Regenerator Chamber

rapidly due to the radiation and transmission of heat to the bath, so that, notwithstanding the fact that the flame in this furnace is much hotter than in other furnaces, the temperature of the escaping gases in the downtakes and in the regenerator chambers is very considerably decreased. In other words, the combustion is completed so early that the maximum amount of heat is retained in the bath, greatly increasing the thermal efficiency of the unit and decreasing the repairs to the downtakes and regenerator chambers.

In practice at the Brier Hill Steel Co.'s plant, the stack temperatures have been found to average 300 deg. Fahr. lower than in their other furnaces. There is not enough data collected as yet to show just what fuel economies can be obtained, but it appears that the saving will be in the neighborhood of 20 to 25 per cent.

One of the greatest advantages of the system is due to the fact that the fuel and air are both thoroughly under the control of the operator so that the temperature of the bath can be regulated to a nicety. On account of the thermal efficiency of the furnace there is less contamination of the bath from the impurities in the fuel.

Although attention is called to the fact that greater economies and greater production can be procured due to these improvements in design, too much stress cannot be laid on the fact that the using of this process enables the operator to make a uniformly better grade of steel. Due to the fact that the charge is melted down so rapidly, a higher percentage of scrap can be used without the addition of carbon, thus making possible the use of a much cheaper mix.

There are many refinements of the blow torch furnace which will be worked out, but the results so far

obtained are so remarkable and the correctness of the principle involved has been so universally acknowledged as to insure its rapid introduction.

#### Other Improvements

This process of combustion has opened up quite a number of possibilities for the further improving of open-hearth construction which deserves very serious consideration. In Fig. 1 is shown an open-hearth furnace in which the regenerators are encased with insulating bricks and steel platework. Inasmuch as the use of the steel platework enables the use of much thinner walls, it is evident that this construction is little more expensive than that which is now used, while the saving due to decreased heat losses is appreciable. Furthermore, the regenerator chambers can be maintained in much better shape and the temperature of the basement is materially decreased, making it much more livable.

A more radical departure is the eliminating of the gas regenerator chambers when using producer gas as shown in Fig. 2. It is proposed to locate the gas producers comparatively near to the open-hearth and conduct the gas in suitable steel mains, properly insulated, to the ends of the furnace and introduce the gas into the air uptakes without any regeneration. This practice becomes possible only by the use of the blow torch principle, where the air and gas thoroughly mix before they issue from the port so that the resultant temperature of the mixture is the only temperature that needs to be considered. Inasmuch as approximately 800 deg. Fahr. stack temperature is now obtained in a blow torch furnace, it is evident that the temperature of the gases escaping through the air checkers is much lower than those escaping through the gas regenerators, as the incoming gas cannot possibly lower the temperature of the gas checkers below 1050 to 1100. Therefore, it is evident that by making all the gases escape through the air regenerators the temperature of the incoming air will be considerably higher than when

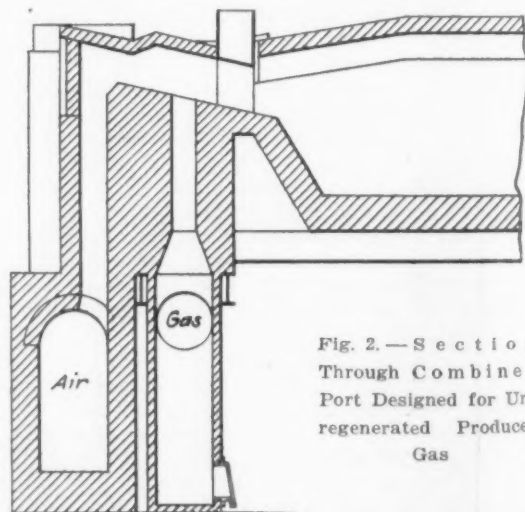


Fig. 2.—Section Through Combined Port Designed for Un-regenerated Producer Gas

the gases are divided and the resultant temperature of the mixture of gas and air will be substantially the same as at present.

This construction appeals strongly to those to whom it has been suggested because it eliminates the gas loss that now occurs whenever the furnace is reversed when not only all the gas from the end of the port back through the generators to the gas valve is lost but with most designs or valves the gas in the mains back to the producers is exhausted by being connected to the stack during reversals. It eliminates the hydrocarbon loss which now occurs in the regenerators and the difficulties due to the clogging of the gas checkers. This construction greatly decreases the volume of the slag pockets and the heat losses due to radiation from the excessive space between the checkers and the ports. Structurally this construction is exceedingly desirable as it greatly decreases the cost of the furnace and shortens the distance required from center to center of furnace by 5 to 10 ft. It also eliminates the center

well in the slag pockets and the need of overhung brackwork in the uptake.

### Conclusions and Advantages

There is no question but that the transition through which the open-hearth is now passing will so increase the capacity of existing units that there will be practically no construction of new open-hearth plants required to meet the demand for steel for a number of years, but one of the biggest problems incident to the introduction of the rapidly operated furnace will be to get the raw material to the furnace and to handle the material on the casting side. New plants must be carefully laid out so as to eliminate as far as possible delays due to shop conditions and doubtless existing ones will need to be considerably altered and improved to take care of the additional materials to be handled.

While previous inventions in the open-hearth have had for their object increasing the comfort of the operators and the decreasing of the shut-downs and repairs to the furnace, the effects of this invention are so far reaching that it is difficult to appreciate the magnitude

of the development. The principal advantages as have been outlined are:

- Better steel
- Increased fuel economy.
- Greatly increased output
- Longer life of the furnace
- Possibility of using a higher percentage of scrap
- Decreased plant cost for a given capacity

By using unregenerated producer gas as proposed, it should be possible to obtain the following additional advantages:

- Additional fuel economies
- Greatly decreased cost of construction
- Simpler construction

No great invention is ever made that does not require considerable study and the careful co-operation of all interested before the full benefits of such invention can be obtained, so it will be necessary to have the hearty co-operation of engineers and operators before the maximum results are derived with the blow torch furnace. However the correctness of the principle is so universally acknowledged and the results already obtained are so remarkable as to necessitate its rapid introduction.

## HIGH TEST IRON CASTINGS

### New Specifications for Castings Containing Steel—The Arbitration Test Bar

New tentative specifications for high-test gray iron castings, familiarly known as semi-steel, were adopted by the American Society for Testing Materials, at its annual convention at Atlantic City, N. J., June 26th to 29th. They represent the latest ideas as to the properties of this much-discussed metal, and also in-

5. When tension tests are specified, the tension test specimen shall show a minimum tensile strength of 28,000 lb. per sq. in.

6. (a) *Arbitration Test Bar*.—The form and dimensions of the mold for the arbitration test bar shall be in accordance with Fig. 1. The bottom of the bar shall be  $\frac{1}{4}$  in. smaller in diameter than the top, to allow for draft and for the strain of pouring. The pattern shall not be rapped before withdrawing. The flask shall be rammed up with green molding sand, a little damper than usual, well mixed and put through a No. 8 sieve, with a mixture of 1 to 12 bituminous facing. The mold shall be rammed evenly and fairly hard, thoroughly dried, and not cast until it is cold. The test bar shall not be removed from the mold until cold enough to be handled. It shall not be rumbled or otherwise treated, being simply brushed off before testing.

(b) *Tension Test Specimen*.—When tension tests are specified, the tension test specimen shall be turned from any

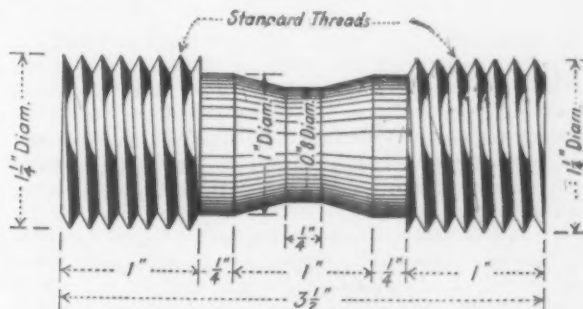
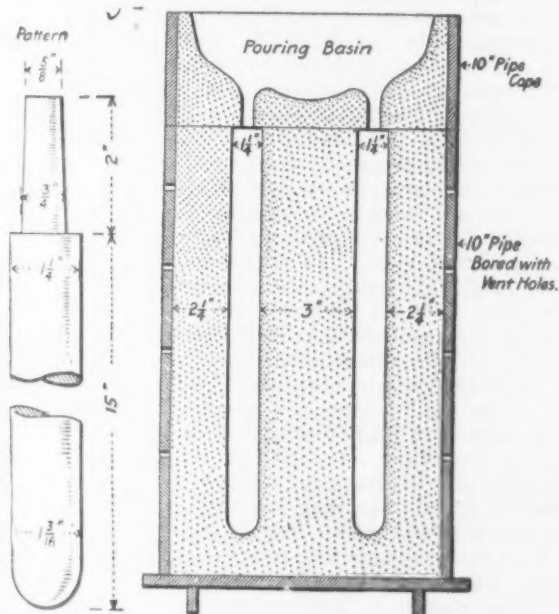


Fig. 1 (Left).—Mold for Arbitration Test Bar  
Fig. 2 (Above).—Tension Test Specimen for High Test Cast Iron

clude details of the arbitration test bar. They are as follows:

1. These specifications cover all classes of gray-iron castings which are required to have a high strength, including those generally known as semi-steel castings.

2. The tension test will be made only when specified by the purchaser and at his expense.

### MANUFACTURE

3. The castings may be made by the cupola, or any other approved process.

### PHYSICAL PROPERTIES AND TESTS

4. (a) The transverse test specimens (arbitration test bars) specified in Section 6 (a), when placed horizontally upon supports 12 in. apart and tested under a centrally applied load, shall withstand a minimum load of 3800 lb. and deflect under this load at least 0.12 in. at the center.

(b) The rate of application of the load shall be such that a central deflection of 0.10 in. is produced in from 20 to 40 sec.

of the broken pieces of the transverse test specimens, and shall conform to the dimensions shown in Fig. 2.

7. (a) Two sets of two arbitration test bars each shall be cast from each melt, one set from the first and the other set from the last iron going into the castings. Where the melt exceeds 20 tons, an additional set of two bars shall be cast for each additional 20 tons or fraction thereof. In case of a change of mixture during the melt, one set of two bars shall also be cast for every mixture other than the regular one. Each set of two bars shall be cast in a single mold.

When a large casting is made for which test bars are required, the test bar shall be cast from the same ladle of iron used to pour the casting. If two ladles are used for pouring the casting, the iron for the test bars shall be poured from a ladle of iron caught between the pouring of these two ladles. In either case the test bars shall be poured at as near as possible the same temperature at which the casting is poured.

(b) All arbitration test bars cast shall be tested as specified in Section 4 (a).

8. One arbitration test bar of each set cast shall conform to the requirements specified in Section 4 (a); otherwise the castings represented by such bars shall be rejected.

### WORKMANSHIP AND FINISH

9. The castings shall be true to pattern and free from

gas holes, cracks, flaws and excessive shrinkage. In other respects they shall conform to whatever points may be specially agreed upon between the manufacturer and the purchaser.

#### INSPECTION

10. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufac-

turer's works which concern the manufacture of the castings ordered. The manufacturer shall afford the inspector without charge all reasonable facilities to satisfy him that the castings are being furnished in accordance with these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

## GERMAN CAPITAL IN RUSSIA

### Reported Combination with Soviet to Exploit Metallurgical Resources on Capitalistic Basis

*By Special Correspondence*

BERLIN, GERMANY, June 28.—Stories have been current for some time that Krupp, Stinnes, and the Allgemeine Electricitats Gesellschaft (A. E. G.) have completed an agreement with the Russian Soviet Government whereby is secured a large control in the restoration of Russia's metal and machinery industries. These three groups for nearly a year have had representatives in Petrograd and Moscow. The German trade press has hardly touched the matter, but Russian and some neutral newspapers have dealt with it at length. The Russian *Rabotchi Golos* of June 11, states vaguely that "an agreement has been signed with the three greatest German iron concerns." The *Christiania Handelstidende* of May 31, professes to give exact details. The Stinnes agent in Russia, says this authority, is a departmental chief of the Siemens-Schuckert Co., which is in the Stinnes Electro-metal combination; Krupp has numerous agencies; and the late Dr. Rathenau sent negotiators on behalf of the A. E. G. At the end of May, says the article, these three companies signed an agreement with the Soviets. A limited liability company is to be established, in which the three German companies will each hold a one-fourth interest, the Russian state taking a fourth interest. The plan is to "utilize Russia's latent natural resources for restoration aims on a sound German capitalistic basis."

Though this story is neither confirmed nor denied, it accords both with the new soviet law, and with similar deals of less importance. The Moscow official *Ekonomicheskaya Zhizn* lately published the text of a law authorizing the foundation of "mixed" corporations with foreign participation; and to date there have been founded nine such corporations: Metallotorg, Napthaexport, Linotorg, Dwinoles, Sewerolles, Kosh-syrie, Derumetal, Russangloles and Russgolandles. The mixed corporation Metallotorg sells and buys scrap metal of all kinds in Russia and abroad. The Derumetal has a monopoly for export of Russian scrap iron to Germany. Its partners are the Soviet Government, and Robert Lewi, chief of the Lichtenberg Metal Co., Berlin; and the capital is 2,000,000 m. The other mixed companies deal in naphtha, flax, animal raw materials and wood. The most important concession to foreign capital is an agreement said to have been reached with the Moscow Supreme Industrial Council leasing all nationalized mechanical workshops at Odessa to the Czecho-Slovak Skoda concern. Prague newspapers state that this deal has been completed but Russian confirmation is lacking.

Before any of these combinations becomes effective, the Soviet Government must first define the relations of foreigners with the lately-formed companies. So far these combinations are entirely Russian. The movement toward large combinations began in the late summer of 1921; progressed, at least on paper, rapidly, and today embraces the greater part of the heavy iron and steel, the locomotive, and the general mechanical trades. The *Krasnaya Gazeta* of June 7, lists 23 of these combinations. All are composed exclusively of formerly nationalized concerns, which have been removed from the direct control of the supreme council of industry, and fused into semi-independent corporations. These companies are permitted to sell all, or a fixed part, of their output in the free market at whatever price can be obtained; and are allowed to import raw materials and fuel without permission of the foreign trade com-

missariat, which in general still claims a monopoly in foreign trade.

Of the metal combinations the most important is Jugostahl (Southern Steel). This embraces the Petrovsk, Makeevsk and Hughesovsk iron and coal companies in South-East Russia. Jugostahl must deliver 75 per cent of its output to the State at State prices; but can sell the remaining 25 per cent at will. At present 35,000 men are employed. A second metal combine is the zinc-lead trust, comprising the Ruidlerovsk smelting works, and the Ekibastuask and Zuirianovsk mines in the Urals, with right to take in other concerns. In the locomotive combination are the Sormova, Kolomensk, Briansk, Muitishensk and Raditsk rolling stock and mechanical workshops, and five other metal works. A second company, formed in November, includes the Nobel, Phoenix, Tillmans, Koppel and two Lessner companies. A third embraces the Ural platinum industry. The total number of employees in metal and mechanical corporations so far is stated as 92,000; but the normal pre-war staff in the same concerns was nearly 300,000.

According to Commissary Okunieff, all these combinations are so far losing money. The losses of the important Jugostahl for September-May inclusive amounted to three-fifths of the value of the output. The official *Ekonomicheskaya Zhizn* suggests as a remedy that the State should pay full market price for goods delivered under agreement by these companies; otherwise "it cannot pretend that the so-called financial independence is a privilege." The main obstacle to financial success, however, is inadequate production. All reports of the new companies' operations in their first months of existence agree that the relative independence from the bureaucratic supreme council, the employment of private experts, and the freedom to concentrate skilled labor, raw materials and fuel in the more efficient workshops (the inefficient being closed entirely) led to a considerable increase in output; but output is still small. In the summer of 1921, before being combined, the Jugostahl companies were producing about 2,500,000 puds (1 pud = 2.2 lb.) of coal a month; this amount increased to 4,800,000 puds in October, the first month they were combined, to 6,000,000 puds in November, and to 9,000,000 puds in January. The pig-iron production rose from 60,000 puds in September to 270,000 puds in November, and 350,000 puds in February. The output of open-hearth steel, castings, and sheets also increased. The production program of this company for 1922 is 10,000,000 puds per month of heavy and semi-finished iron and steel.

Last reports show that in all Soviet-Russia the coal output has again begun to decline, whereas the iron and steel output is still increasing. Coal output, in April, was 25,202,000 puds. The iron-ore output in March was 1,216,000 puds against 850,000 puds in February. The output of foundry iron in January and February was 1,805,000 puds, open-hearth steel 3,500,000 puds, and rolling mill products 2,226,000 puds, as against 7,083,000 puds, 10,025,000 puds and 12,303,000 puds respectively for the whole of 1921. The figures for this year show a considerable increase.

### Shipping Board Sales

WASHINGTON, July 18.—The auction sale of the Emergency Fleet Corporation of its surplus marine stock at St. John's warehouse, Portland, Ore., has been completed and as a result practically all of the material has been disposed of at that point. The total receipts were approximately \$51,000.

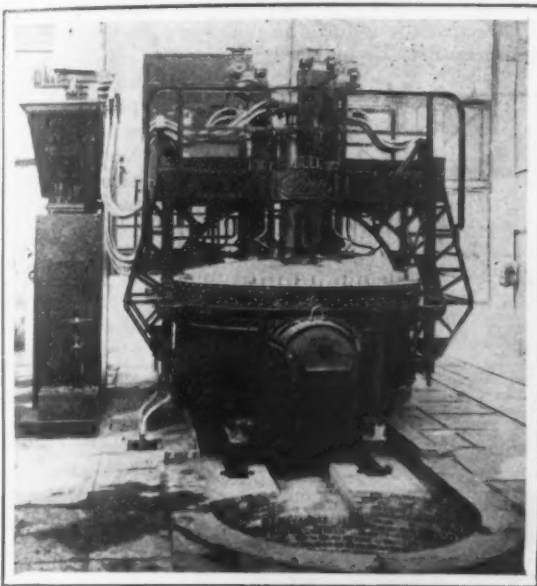
The next sale of the Shipping Board's property on the Pacific Coast will take place at Tacoma, Wash., July 25.

## NEW FIAT ELECTRIC FURNACE

### Characteristics and Claims of the New Italian Melting Unit

BY DR. ALFRED STROMBOLI\*

WHEN Stassano in 1898 brought to the metallurgical world his new electric furnace for the manufacture of steel, the Italian steel mills quickly realized the great advantages of this new process, but only during the World War period did they adopt it on a large scale. The scarcity of coal and the poor quality of



The Fiat Electric Steel Melting Furnace

pig iron, both of which had to come from foreign countries, was no doubt the deciding factor. Some of the largest steel mills were confronted with the serious problem of how to fill their orders. Notable among them was the Fabbrica Italiana d'Automobili di Torino (Fiat), which had to produce 1000 tons of steel ingots per month. Such a production could never be obtained by the ordinary processes, due to the great difficulty in getting cool and raw material on time and of good quality.

The necessity of finding a type of electric furnace of large capacity and able to make steel out of iron and steel scrap was an urgent problem. After much study and a series of tests the decision to build a new type of Fiat electric furnace was reached. The Fiat works immediately started the construction of a furnace which has achieved success during its continuous operation for five years. Of this type of furnace there are six of 5 and 6 tons capacity and one of 1½-ton capacity in service at the Fiat works and four of 20 tons capacity, two of 6 tons and two of 3 tons capacity at the Ferriere Piemontese, Turin, also part of the Fiat works.

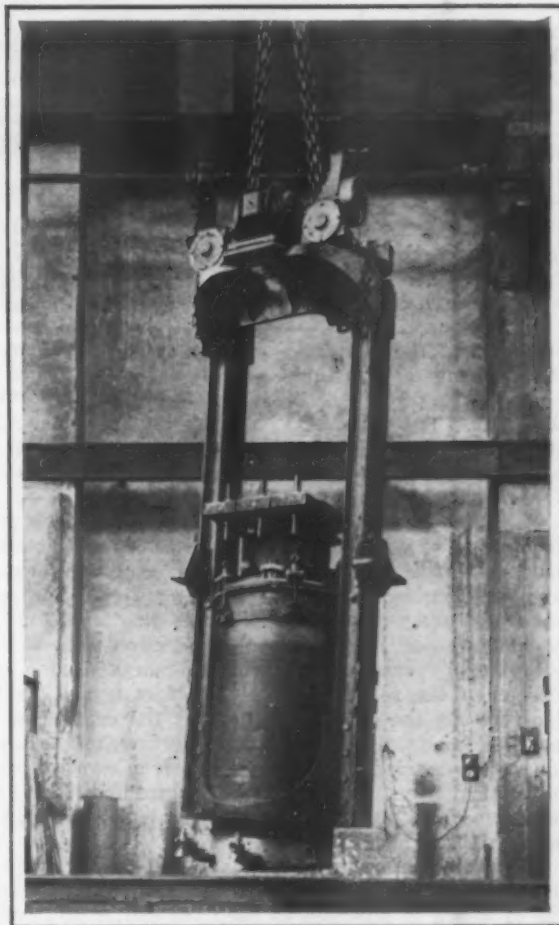
This type of electric furnace was so successful that the Fiat company decided to organize the Fiat Electric Furnace Works for the exclusive construction of electric furnaces. A brief description of the main characteristics of these furnaces follows:

The Fiat furnaces are of the three-phase system having the neutral grounded through the furnace's frame. One illustration shows an external view of a 5-ton furnace. A rigid steel cylinder having a concave base and reinforced by means of riveted steel angles forms the frame. Circular cast steel rockers are provided at the base for the two movements of the furnace. At the top the removable cover is of silica brick and encircled by a wrought iron ring. This cover tightly closes the furnace by means of four lateral hinged bolts. On opposite sides of the frame two openings are provided for the charge, purification and discharging of the metal. This furnace is moved by means of two hydraulic engines having oscillatory cylinders, with

their pistons attached to the two rockers on the furnace.

One of the most important features of the Fiat furnaces is the Fiat economizer or electrode supporter. The Fiat electrode supporter will not allow air to get into the furnace through the opening made in the roof for the passage of the carbon electrodes. This is accomplished by means of a specially designed supporter. The air which penetrates into the furnace not only has the disadvantage of considerably shortening the life of the electrodes, but, worse yet, enormously decreases the efficiency of the furnaces.

The Fiat economizer was briefly described in *THE IRON AGE*, Feb. 23, 1922, page 538. This economizer is so designed that it can be quickly cleaned, inspected or removed from the furnace as shown in one illustration. Before the use of this device the electrodes used to burn to a conical shape and even 30 or 40 cm. on the part outside of the furnace. There was also great damage done by the escaping gas. When the electrodes burn out in a cylindrical shape it is obvious that they can carry more electrical current and will last longer. An electrode which had an initial length of the point of 1.5 m. (4.9 ft.) and weighed 120 kg. (265 lb.), after serving 21 full charges on a 5-ton Fiat furnace, each charge having been cold, was reduced in length to 25 cm. (9.8 in.) with the weight to 20 kg. (44 lb.). This represents a consumption of only 2.85 kg. (6.3 lb.) of electrode per ton of steel.



The Fiat Economizer as It Appears When Lifted Out of the Furnace

The potential used in the Fiat furnaces is 130 to 75 volts stepped down from a 21,000-volt supply line. The first voltage, 130, is used for the first stage, that is, to melt the metal, and the lower one to maintain the metal in a molten condition during the refining process.

Costello continuous pair furnaces are to be installed in the plants of the Wheeling Steel Corporation, the Newton Steel Co. at Newton Falls, Ohio, and the Superior Sheet Steel Co., Canton, Ohio, by Tate-Jones & Co., Inc., Pittsburgh.

\*Turin, Italy.

## NEW CRAWLER CRANE

### Lower Frame a One-Piece Casting—Improved Control Features—Mechanism Described

The crawler crane shown in the illustration and which embodies a number of new features has been placed on the market by the Link-Belt Co., Chicago. Without bucket the machine weighs 22 tons, making a ground pressure of 10 lb. per sq. in. and it is rated to lift 10 tons at 12 ft. radius and three tons at 30 ft. radius. The hoisting speed is 125 ft. per min. with a maximum rope pull of 10,000 lb. on a single line. The machine is suitable for both clam-shell and drag-line bucket work, having two independent band-clutch operated hoisting drums. The crane will rotate four times a minute, travel  $\frac{1}{4}$  mile per hour and climb a 20 per cent grade.

The shoes are 18 in. wide, of 12 in. pitch, and made of one-piece high-carbon chrome steel castings with machined holes for  $1\frac{1}{4}$ -in. diameter high-carbon pins. There are eight bronze-bushed crawler rollers, 25 in. in diameter. The overall width of the crawler tread is 9 ft. 7 in., and the distance from center to center of the sprockets, lengthwise, is 10 ft., giving a bearing area of 30 sq. ft. The lower frame is a one-piece annealed open-hearth steel casting designed to carry the severe diagonal stresses of a machine of this type.

A hollow cast-steel dead axle housing has been provided on which the load carrying sprockets are mounted and inside of which the floating drive axles are located, cut bevel gearing running in oil being used. The control clutch steering the caterpillar, is also placed inside the housing and is in constant connection with a foot lever on the operator's platform, and can be used in any position of the rotating base. The foot lever also instantly locks the caterpillar, so that the crane can be operated on an incline without resorting to blocking. The bevel gearing underneath the frame, connecting the vertical travel shaft with the longitudinal rear axle countershaft, is also inclosed in a cast-steel casing, the gears running in a bath of oil.

The rotation gear, roller path and center casting form a single steel casting 7 ft. in diameter, the large size of which is intended to keep the center of gravity of the rotating frame within the roller race, thereby materially reducing the stresses in the center pin and rotating mechanism. The upper rotating frame, a single-piece annealed open-hearth steel casting, 14 ft. long, 5 ft. wide, and 11 in. deep, rotates on four 12-in. diameter, 4-in. face finished and bronze-bushed conical steel rollers, and is held to the lower frame by a finished forged steel center pin.

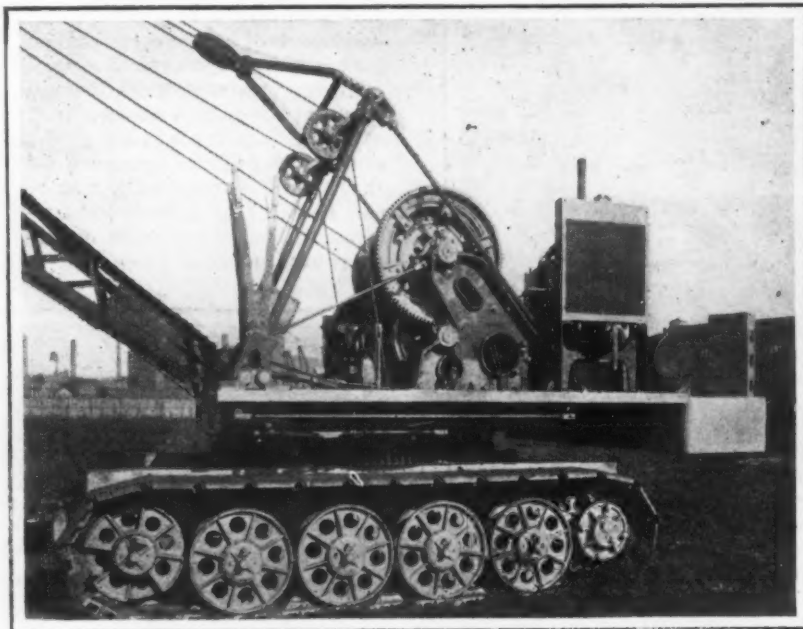
The machine is driven by a Climax Engineering Co. four-cylinder, heavy-duty tractor engine with a gasoline tank of 30-gal. capacity, or enough for about 15 hr. continuous operation. A 40 hp. electric motor can be provided instead of the gasoline motor, if required. All gears with the exception of the rotation gear and pinion, have machined teeth. There are

only three bevel gears on the rotating frame and only 16 gears of all descriptions in the entire crane.

The reversing friction clutches for swinging, traveling and boom hoisting are of the expanding type and may be applied with a minimum of effort. The boom hoisting mechanism is automatically self-locking. The brake drums are mounted on extended hubs of their respective rope drums and connected with them by means of ratchet and pawl mechanism. The operator can set his brakes either before or while hoisting his load, so that the moment he pulls his hoist clutch out of engagement his load is automatically held in position. This permits a less skilled operator to run the crane, as it requires a certain amount of dexterity to manipulate clutch and brakes simultaneously.

The construction of the crane is such that all of the machinery may be inclosed. Inside the housing there is

an unobstructed platform, 30 in. wide the full length on each side of the rotating base so that the machinery is easily accessible. The machinery may be dismantled without disturbing the house. All necessary attachments for hook block, grab bucket, dragline bucket, pile driver and magnet up to 45 in. in diameter, are included in the equipment.



Crawler Crane Rated to Lift 10 Tons at 12 Ft. Radius and 3 Tons at 30 Ft. Radius. The boom is 35 ft. long and of angle and lattice bar construction, parabolic in shape

### New Use for Steel

What may be referred to as a new use for steel

has been observed in the way San Francisco holds back its crowds in providing for parades. Most of the marching celebrations occur on Market Street, from the Ferry Building to the City Hall. The police department has adopted a plan of stretching a strong steel cable along the street near the curb.

The cable is supported by heavy wooden posts at regular intervals. The posts are let into holes in the roadway pavement, about a foot out from the curb. To protect the edge of the hole and to hold the post firmly, a flanged iron collar is set into the top of the hole. An iron cover, similar to the cover of a small waterworks valve box, is kept on each hole when the posts are not in place. At street intersections, the cable is laid in the adjacent gutter until a few minutes before the approach of the parade, when it is drawn across the intersecting roadway by the policeman in charge of each intersection. Police department wagons follow up the parade and the posts are loaded into these and the rope is wound up on drums, the entire equipment being stored in the basement of the Hall of Justice.

### Compression Tests of Forging Steel

A series of compression tests at temperatures between 20 and 700 deg. C on carbon forging steels has been completed at the Bureau of Standards, Washington. In this series the proportional limit decreased slightly with rise in temperature of 300 deg. C and thereafter more rapidly to a very low value at 700 deg. C. The yield point which was determined by means of the drop of the beam of the testing machine first increased and then decreased.

# Fuel Gases in Iron and Steel Plants

## Characteristics of Blast Furnace, Coke Oven and Producer Gas, and of Their Use in Continuous Heating Furnaces

BY H. S. WATTS\*

**B**LAST furnace gas, producer gas and coke oven gas are the only fuel gases which can claim general usage in steel plants. Natural gas has come into disuse because of the limited supply available, and blue water gas has not passed the experimental stage in the industry.

Blast furnace gas has been available, with the production of pig iron, since the advent of the closed-

These analyses show producer gas and blast furnace gas to be strikingly similar in the large proportion of non-heatbearing components, in contrast to coke oven gas, which is composed almost entirely of compounds having fuel value. Further, it may be seen that furnace gas has a higher percentage of carbon dioxide than producer gas, while the latter contains more free hydrogen and hydrocarbons than furnace gas. Again, coke oven gas has a very small percentage of carbon monoxide, while the other two gases depend largely upon this compound for their fuel values. These variations in composition are due to methods of manufacture.

### Production of Blast Furnace Gas

Air under pressure, entering the lower part of the furnace through a set of tuyeres, and coming into contact with incandescent carbon, results in forming carbon dioxide. In the presence of additional carbon, this is converted into carbon monoxide. Passing upward through the charge of ore, coke and limestone, a part of the monoxide is again changed to the dioxide in the reduction of ores. In the gas at the top, both oxides are present. Additional carbon dioxide is produced in the upper part of the furnace, due to the roasting of limestone.

The water vapor, contained in the air blown, is acted upon by hot carbon, with the formation of carbon monoxide and free hydrogen. The former is subjected to the same changes as the monoxide formed

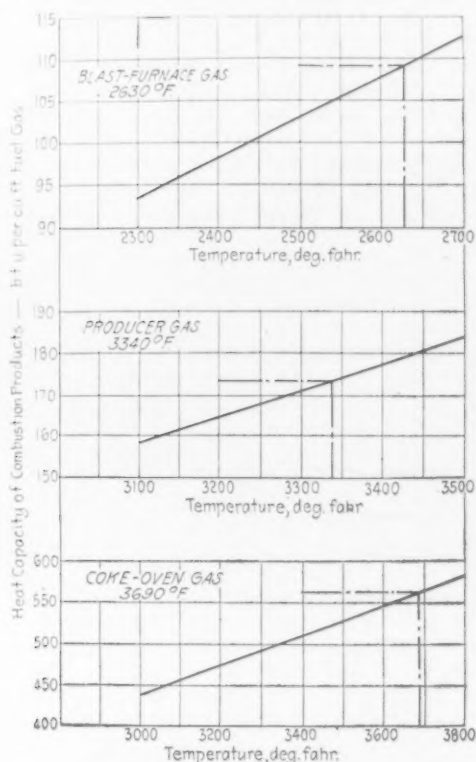


Fig. 1. Theoretical Combustion Temperatures of Blast-Furnace Gas, Producer Gas and Coke-Oven Gas

top blast furnace. Similarly, coke oven gas has been collected and used in large quantities where by-product coke ovens are installed. Producer gas, once the most generally used fuel in steel plants, is now employed on certain operations when there is not enough coke oven gas.

A fuel gas is principally characterized by its chemical analysis. The proportions in which the various constituents are found bears strongly upon its action in the furnace, its adaptability to certain operations, and, in general, its value as a fuel. Volumetric analyses of typical gases are shown below. Since all of these gases are derived primarily from coal, it is not unusual that they have practically the same constituent compounds. Carbon monoxide, hydrogen and the hydrocarbons are the heat-producing components.

### ANALYSES OF TYPICAL GASES

	Percentage Composition		
	Blast Furnace Gas	Coke Oven Gas	Producer Gas
Carbon Dioxide, . . . . .	12.8	1.8	6.2
Carbon Monoxide, . . . . .	26.0	3.5	22.3
Ethylene, . . . . .	0.2	3.0	0.3
Methane, . . . . .	0.2	34.6	3.5
Hydrogen, . . . . .	3.0	53.9	12.3
Nitrogen, . . . . .	58.0	3.2	55.4

\*Steam Engineer, Otis Steel Co., Cleveland. Abstract of paper presented before the Association of Iron and Steel Electrical Engineers.

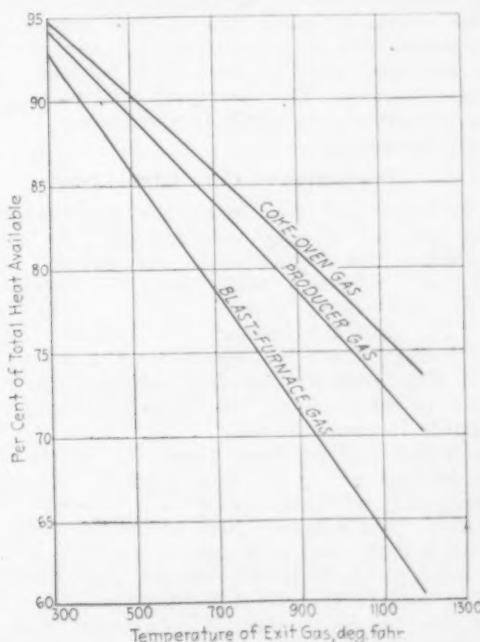


Fig. 2. Percentage of Heat Available with Perfect Combustion of Fuel Gases

by the introduction of air. The hydrogen passes upward through the column, and a portion of it may combine with the carbon to form methane. The small quantity of volatile matter in the coke is driven off in the upper strata, and is represented in the analysis by additional quantities of free hydrogen and methane.

Incombustible constituents include the carbon dioxide formed in the manner indicated, and the inert nitrogen derived from the air blown and, in small quantities, from the fuel. These components aggregate at least 70 per cent of the total volume. Another in-

combustible and very objectionable component of blast furnace gas, which does not appear in the chemical analysis, is water vapor. This is due to the vaporization of the moisture in the materials charged, and the water thrown on the charge in the skip bucket to lower the temperature at the top of the furnace. The evaporation occurs at or near the top of the column. The quantity of water vapor present may be roughly estimated, normally, at 30 grains per cu. ft. of gas, with a corresponding dew-point of 115 deg. Fahr.

Flue dust present in this gas is in quantities which vary widely with the furnace operation; but the

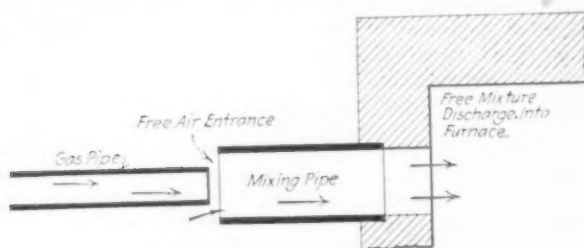


Fig. 3. Gas Burner Diagram

greater part is extracted before the gas reaches the point of consumption. The normal temperature of the gas leaving the furnace is about 400 deg. Fahr. In gas cleaners, where water is used to carry out the dust, the sensible heat of the gas is lost, depreciating its heating value somewhat less than 10 per cent. Due to the reduction of the gas temperature in passing through the wet washer, the vapor content is reduced.

The quantity of gas produced in the furnace varies slightly with the operation. For many reasons, it is difficult to measure the volume, but this may be closely estimated by reference to the analysis of the gas, and the analyses and weights of the materials charged and produced. In the particular case from which the typical analysis was taken, the volume generated was 68.7 cu. ft. at 32 deg. Fahr., per pound of coke charged. Since the calorific power of the gas is about 100 B.t.u. per cu. ft., the heat of the gas represents more than one-half of the heat in the coke charged. This fact may lend more interest to the problems confronted in the proper utilization of blast furnace gas.

#### Production of Coke Oven Gas

Coke oven gas is a by-product obtained in the modern process of coke manufacture. As the coal spaces are sealed so that no air may enter, and practically no combustion take place, the volatile constituents are slowly driven from the coal, leaving coke. The gas is collected in a common, overhead main, through which it is conducted to the by-product plant. The process primarily intended for the extraction of by-products, fortunately, is effective in thoroughly cleaning the gas.

Hydrogen and methane form, in the typical analysis, 88 per cent of the total volume. Unsaturated hydrocarbons, or "illuminants" are present in small quantities. The balance of the volume is composed of nitrogen and the two oxides of carbon. These formations are due both to the oxygen and nitrogen in the coal, and to the slight infiltration of air. Ordinarily, the foreign matter is so completely removed as to pass notice, except for occasional clogging of valves and fittings. The gas is usually saturated with water vapor at the point of consumption, but since the temperature is that of the surrounding air, the quantity of vapor contained is small.

Due to the large percentage of heat producing constituents, and the correspondingly low non-combustible proportion, the heating value of this gas is high. The standard cubic foot, at 32 deg. Fahr., has a net heating value of approximately 550 B.t.u. The gas weight is about 0.4, referred to air. The volume of gas generated depends upon the quantity of volatile matter in the coal and, to some extent, upon the operation. Normally 9000 to 11,000 cu. ft. are produced per ton of dry coal used. It then appears

that the total volume of gas contains about one-fifth of the total heat of the coal charged. In the great majority of coke plants, about 40 per cent of the gas is used for heating the ovens; the other 60 per cent being available for mill use.

#### Producer Gas

In many respects, the formation of producer gas is similar to that of blast furnace gas. Air is forced into the producer at or near the base, usually by means of steam-jet blowers. When in operation, there are three general zones, of which the upper consists of the green fuel charged at the top. Immediately beneath this is the hot zone of incandescent coke which, in the cycle of operation, after being relieved of its volatile components in the upper zone, has been passed to the lower position. Beneath this, a bed of ashes forms the lower zone.

The fundamental chemical reactions in the producer are simple. Air and steam, entering at the base, soon encounter incandescent carbon in the hot zone. Oxygen from the air unites with carbon, forming carbon dioxide, and heat is liberated. Part of this heat is reabsorbed when the dioxide, in the presence of additional carbon at a high temperature, is converted into monoxide. The steam or water vapor reacts with the hot carbon, forming carbon monoxide and free hydrogen. This reaction also absorbs a portion of the heat liberated in the hot zone. The hydrogen passes up through the fuel bed and a part

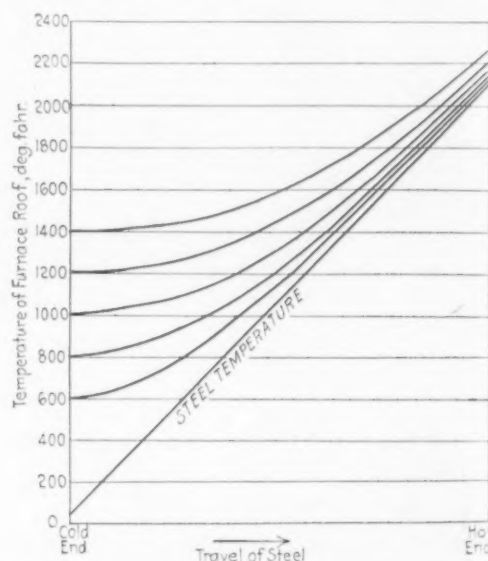


Fig. 4. Roof Temperatures Required to Give Equal Heat Transfer at All Points in Continuous Billet Heating Furnace

of it may combine with carbon to form methane. The other portion enters the final gas in the free state.

Volatile matter contained in the coal charged is driven off almost immediately after the introduction of the fuel at the top. This appears in the analysis as free hydrogen and hydrocarbons, saturated and unsaturated, the latter in proportions dependent largely upon the temperature of distillation. Low temperatures favor the formation of tarry vapors, which condense under reduced temperatures in the flue and deposit soot, while high temperatures favor the formation of fixed gases, such as methane. In any case, however, the proportion of condensible vapors is small.

Incombustibles, nitrogen and carbon dioxide, comprise about 60 per cent of the total volume. The nitrogen present, neglecting the small quantity driven from the coal is derived from the air blown. The carbon dioxide may vary considerably with the operation, and gives an excellent indication of the efficiency of the process. A high percentage may indicate a thin fire or a relatively cold producer. The latter may be caused by slow running or by an excessive use of steam. High hydrogen content also points to the use of too much steam.

Both heat-liberating and heat-absorbing reactions

occur in the producer. The quantity of heat liberated exceeds the heat absorbed; the difference raises the temperature of the gases generated. The temperature is maintained within desired limits by proper control of the steam supply, in relation to the air blown. The normal temperature is about 1,100 deg. Fahr. The total heat of the gas is more than 150 B.t.u. per standard cu. ft., and approximately 70 cu. ft. are produced per pound of coal used. The weight of the gas is about 0.9, referred to air.

#### Combustion of the Three Gases

As indicated above, these gases are mixtures of carbon monoxide, free hydrogen, hydrocarbons and incombustibles. The first three named components have stored-up energy in the form of latent heat, liberated when they are acted upon chemically by oxygen. When they are brought into intimate contact with air at high temperature and in proper proportion, combustion takes place.

The chemical reactions are not complex. Carbon monoxide combines with oxygen from the air to form carbon dioxide; hydrogen combines with oxygen to form water vapor; the hydrocarbons combine with oxygen to form both carbon dioxide and water vapor. Each of these reactions is accompanied by the liberation of heat. When sufficient air is supplied, complete oxidation and maximum heat liberation take place. No other compounds are formed, in considerable quantities, in the process of combustion. The products of perfect combustion contain these two gases and, in addition, the nitrogen content of the air used for combustion, and the carbon dioxide and nitrogen from the original fuel. The greater portion of the liberated heat immediately raises the temperature of the products of combustion. Part of the heat may be re-absorbed or dissipated to the furnace walls. The temperature to which the remaining heat is able to raise the products of combustion is called the combustion temperature.

For various reasons, it is almost impossible to derive the real temperature of combustion from the gas analysis. The so-called theoretical temperature of combustion is sometimes used in comparing gases and, for relative values, gives satisfactory results. This is the temperature which would be obtained if all the heat liberated were used to heat the products of combustion. We have roughly calculated this value for the various gases, as shown in Fig. 1. The curves show the sensible heat capacity of products of perfect combustion at given temperatures. The ordinate, representing the sum of the latent and sensible heats of the fuel gas, and the sensible heat of the air, all above 0 deg. Fahr., has a corresponding abscissa which gives the theoretical temperature of combustion.

High combustion temperature is favored by high proportion of combustibles in the fuel gas, because of the greater heat available for a given quantity of combustion products. We may naturally expect a high combustion temperature with coke oven gas, practically free from incombustibles, compared with furnace gas, which has less than 30 per cent of its volume in heat-bearing constituents. Proper regulation of the air supply also promotes high temperature of combustion. For every gas, there is a theoretical quantity of air required for complete oxidation, which may be calculated from the chemical analysis. In actual operation, complete combustion under these conditions is never obtained.

Gases are sometimes valued commercially according to net calorific power. If it were possible to reduce the temperature of the stack gases to that of the atmosphere, this valuation would be more consistent. Unfortunately, this operation is not practicable, and combustion is always accompanied by a stack loss. The calorific power of a gas is a direct measure of the heat liberated in the furnace under the best conditions, but the composition of the gas largely controls the quantity of heat passing out with the waste gases, other conditions remaining the same. Each gas has an inherent stack loss. The difference between the net calorific power and the stack loss gives the heat available, and this figure should be

used in any attempts at commercial valuation.

Specific conditions affect the relative value of gases on various operations. Fig. 2, giving the percentage of net calorific power available for the three gases, with various stack temperatures, shows that the effect of incombustibles on stack loss is accentuated by increased stack temperatures. In view of the foregoing, it is natural to expect the wide divergence of points representing high stack temperature conditions, and the close approach to a common value, at points representing low stack temperatures.

#### Contact Between Gas and Air

There are at least three general methods employed to bring the gas and air into direct contact. The two fluids may enter the furnace or combustion chamber

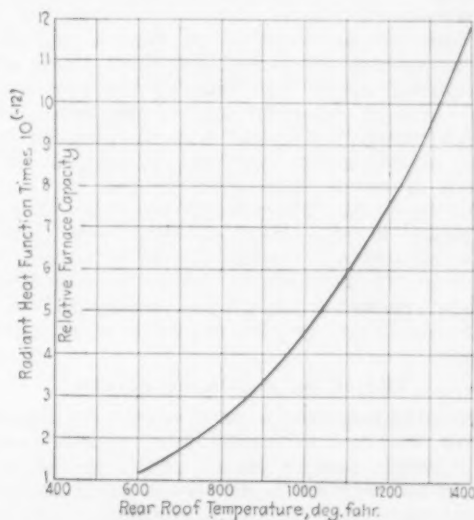


Fig. 5. Furnace Capacity Corresponding with Various Rear Roof Temperatures

through separate ports at relatively low velocities. In this case, at the beginning of the travel across the furnace, the air and gas pass in separate lanes, mixing taking place only at the plane of contact between the lanes. The combustion along this surface causes a disruption of the stream line flow, and the speed of combustion may be accelerated continuously until the gases reach the outlet port. By means of bridgewalls and irregularly-shaped roofs, the stream line travel may be further broken, further increasing the speed of combustion.

The air, which is heavier than most gases, may be introduced above the gas; after entrance, its general downward travel causes it to engage the gas and cause further mixing. This general method of operation produces the "lazy flame." It has had long and successful usage and is easy to manipulate. It has the advantage of producing the "mild" or "soft" flame, and of producing a flame of great length, resulting in direct radiation from the flame to the steel over all sections of the furnace. In some cases, particularly in slab furnaces, the flame also finds its way under the steel, resulting in direct radiation to the under side.

The greatest objection to this method of operation is that it causes delayed combustion which results in high stack temperature and loss. The rather indifferent mixing frequently permits incomplete combustion, even with an excess of air supplied to the furnace.

Another method of introducing air and gas provides for the impinging of the two streams upon each other at high velocities. This disturbance causes a random motion of the elementary volumes of which the air and gas are composed, and increases the probability of direct contact. To carry out this principle more fully, the air and gas are sometimes divided into a number of impinging streams, causing complete mixing in a shorter travel.

This last method employs the eddy-flow principle to cause the mixing action. For every gas or mix-

ture of gases, flowing through a given conduit, there is a critical velocity which marks the change from streamline flow to eddy or turbulent flow. At lesser velocities the mass of fluid proceeds in straight lines, while at greater velocities a whirling motion is set up. It is natural to expect that, if the fluid mixture traveling above the critical velocity were composed of quantities of air and fuel gas, a thorough mixing action would be obtained. The completeness to which any mixing is carried depends upon the line of contact between the components. The whirling flow gives a long line of contact in a short travel.

In general, the effort required to produce proper mixing depends upon the richness of the gas. Poor gases have a high percentage of incombustibles, and the presence of these inert constituents decreases the probability of direct contact between the important constituents.

Perhaps the best method of mixing the air and gas is to combine the second and third plans, obtaining a mixing action due both to the impinging of streams at high velocities and to the action of the turbulent stream. The air may be supplied to the port or burner under external pressure, or it may be forced in by the impact of the gas, by the stack draft or by both. The specific conditions determine which means is most suitable. When conditions permit, it is advisable to use the aspirating burner, which draws in air for combustion, due to the impact of the gas mass. Its use is limited but, within its own field, excellent operation is obtained with a minimum of attendance.

#### Use of the Aspirating Burner

Aspirating burners, properly designed and applied, will give the desired condition of constant air-gas ratio. Certain factors should influence the design, and definite methods be employed in obtaining the given air-gas ratio. It is not contended that adherence to these principles will yield a burner which will function perfectly, but, with this method as a starting point it should be possible, with the aid of experimentation, to proceed to the construction of a real, constant-ratio aspirating burner.

Fig. 3 shows the aspirating burner in its simplest form. A jet of gas issues from the gas pipe into the mixing pipe, which is open at both ends. Due to the impact of the gas stream, air is drawn into the mixer in contact with the gas. The mixture passes through the mixing pipe at a velocity exceeding the critical speed, and a turbulent motion is set up, thoroughly mixing the gas and air components. Passing to the furnace, this homogenous mixture is ready for rapid combustion.

Assuming no loss in energy due to friction, eddy currents, etc., the ratio of air to gas is a function of the ratio of gas pipe and mixer pipe areas, and is independent of gas velocity. Further, with a given burner, the mixture ratio is substantially constant for all gas velocities within reasonable limits.

Obviously, such a burner would automatically adjust the air supply to the varying gas supply as long as the gas composition and temperature remain the same. This feature admirably fits the conditions under which blast furnace gas is supplied. Usually, as no attempt is made to keep it constant, the pressure of blast furnace gas is subject to considerable and frequent variation, due to the variation in the rate of gasification through the cycle of furnace operation.

Successful application of the aspirating burner is limited by the momentum available in the gas stream, for a given weight of mixture. Gases with a high percentage of incombustibles are heavier and require less air than the richer gases. The use of a burner of this type is limited to poor gases, and particularly to blast furnace gas. This appears to differentiate against its use on coke oven gas for, with the large mixing tube which would be required, it would be impossible to transfer the energy of the small gas stream uniformly to all parts of the mixture stream.

#### Heating Steel in Continuous Furnaces

The continuous billet-heating furnace presents some interesting problems relating to heat transfer.

The furnace bottom is almost completely covered by long billets placed transversely. In the charging operation, as each cold bar is pushed in at the rear of the furnace the entire charge is advanced, the forward bar having been previously withdrawn for the mill. The continuous furnace may be described as one in which the steel, as it progresses slowly from the cold end of the furnace to the hot end, is subjected to a gradual and uniform rise in temperature.

In many furnaces of this type, due to careless operation, the temperature of the steel rises but slightly in passing over the first half of the course, and the greater portion of the heating is accomplished in the third quarter of travel. The last quarter is used as a soaking area, in which the heat on the upper portions of the steel is allowed to pass to the inner and lower portions. In other cases we find the rise in temperature more uniform over the entire length of steel travel. It is interesting to study the conditions necessary to produce this gradual and uniform temperature rise, particularly since, as will be freely admitted, this is the best method of operation.

Since the temperature rise of the steel must be substantially uniform, the rate of heat transfer to the steel must be equal over all sections of the furnace. If we neglect the transfer of heat to the steel by convection it may be assumed that all of it is transferred by radiation from the flame or roof. Since the rate of heat transfer to the steel must be the same in all sections of the furnace, the difference of the fourth powers of the absolute temperatures of the flame or roof and the steel must be constant, in all sections. Now the roof temperature is necessarily less than the flame temperature, and in combining the two radiant values, the effective temperature must be used. For convenience, this temperature will hereafter be referred to as the roof temperature.

Referring to a specific case, let the steel enter the furnace at 60 deg. Fahr., and be subjected to a uniform temperature rise until it is discharged at a temperature of 2100 deg. Fahr. Since the rear end temperatures are lowest and most easily reckoned with, we use them for a basis in calculation. Assuming a rear end roof temperature, and recalling the temperature range of the steel, we may readily solve for the radiant heat transfer characteristic, the difference of the fourth powers of the absolute temperatures of the roof and steel. This is comparable to a force which drives the heat from the roof to the steel.

Having this function properly evaluated it is possible, by reference to the desired steel temperatures at the various points in the steel travel, to determine the corresponding roof temperatures required at these points. This yields a series of roof temperatures which, under the assumptions, will give the condition of uniform steel temperature rise as required. This procedure was followed in plotting the curves shown in Fig. 4, one curve being drawn for each assumed rear roof temperature. Along each curve the driving force is constant. Each curve represents a constant rate of heat transfer, and therefore a definite furnace capacity.

Further, in Fig. 5, a curve has been plotted to show the relation between the rear roof temperature and the capacity of the furnace operating under these conditions. It appears in this case rather unusual to find that the furnace capacity with a rear roof temperature of 1400 deg. Fahr. is ten times as great as the capacity obtained with a rear roof temperature of 600 deg. Fahr. It may appear perhaps more unusual to find that a similar capacity ratio is obtained with front roof temperatures of 2263 deg. Fahr. and 2120 deg. Fahr., respectively.

Attention is called on Fig. 4, to the wide divergence of points representing conditions at the rear end of the furnace, compared with the proximity of the points representing the front end conditions. This indicates that the furnace capacity may be considerably increased by a slight rise in temperature of the roof at the hot end. Again it may be seen that, to effect considerable heat transfer at the rear end of the furnace, a wide divergence of roof and steel temperatures is necessary. This may add weight to the

statement that the combustion temperature is extremely important. It may also give a clearer explanation of the low furnace efficiency caused by the high rear gas temperature necessary to provide the high rear roof temperature required.

#### Roof Length and Capacity

The proper length of roof is often in question. Clearly, the addition of furnace length cannot well be used to reduce appreciably the stack gas temperature. From Fig. 5 it may be seen that the heat transfer is seriously compromised by reduction in temperature at the rear end. This indicates that an enormous increase in furnace length would be required to reduce appreciably the stack gas temperature. The fact that a vast expanse of low temperature roof at the rear end is not particularly effective is undoubtedly well known to furnace manufacturers.

If it were possible to obtain reasonably low stack gas temperatures by making a moderate increase in the furnace length, this method would have been resorted to long ago. Instead of this, we find the general use of recuperators. These are built to absorb heat from the waste gases and transfer it to the air supplied for combustion. Perhaps no part of the furnace presents so many operating difficulties as the recuperators; and in some cases these have been discarded because the saving in heat did not justify the expense incurred in their proper maintenance. Of course, when it is necessary to preheat the air in order to maintain the required combustion

temperature, this reasoning does not apply; but the use of recuperators on billet heating furnaces admits the failure of the longer furnaces in reducing the stack gas temperature.

Other conditions remaining the same, the length of the furnace determines its capacity. It might be thought that the furnace capacity is limited only by the extent to which the radiant heat function or driving force can be increased. The latter is limited in two ways. At the hot end, the roof temperature must not exceed the fusion temperature of the best refractories. The other limit is measured by the rate at which the steel will allow heat to be conducted through its mass.

If the transfer of heat to the steel exceeds the conductance of heat through the steel, there will be a non-uniformity of temperature in the steel cross-section. If this condition is allowed to prevail for a sufficient length of time, the inevitable result will be the fusion of the steel section. Such operation not only ruins the structure of the bar, but seriously impedes the continuous operation of the furnace.

We may therefore say that the capacity of a given furnace is limited by the capacity of the steel to conduct the heat from its upper surface to its inner and lower portions. After this point is reached, the capacity may be increased only by the addition of furnace length. It seems wise to make the length sufficient to give the desired capacity when the rate of heat transfer from the roof to the steel is near the maximum rate of heat conductance through the steel.

#### Globe Seamless Tubes Co. to Pass to New Ownership

Negotiations are under way and are expected to be completed soon for the sale of the Globe Seamless Steel Tubes Co., Chicago, manufacturer of steel boiler tubes and mechanical tubing, works of which is at Milwaukee. William Renshaw, Chicago, president, and Lawrence Fitch, Milwaukee, vice-president and secretary, principal owners of the company, will retire. The new interests will be headed by Robert P. Lamont, president, the American Steel Foundries, Chicago; Paul J. Kalman, St. Paul, Minn., president, Paul J. Kalman Co. and also of Bliss & Laughlin, Inc., and the Hudson Motor Co. of Illinois; and by Frank J. O'Brien, present vice-president and general manager of the company, who will continue in active charge of the business.

#### Proposed Alabama Iron and Coal Merger

A merger of Alabama iron and coal properties is reported to be under negotiation. The Alabama Co., owning the two Clifton blast furnaces at Ironaton, Ala., and the two Etowah furnaces at Gadsden, Ala., is the only company whose name has been mentioned, but four or five companies, in all, are being considered. Negotiations are being conducted by Lloyd H. Atkinson, whose office is with Crocker Brothers, 21 East Forty-fifth Street, New York. Mr. Atkinson was for some years with the Bethlehem Steel Co., and later was a member of the firm of Atkinson & Utech, railroad supplies.

The Alabama Co. owns about 1750 acres of land at Gate City, Ala., containing deposits of red iron ore, limestone and dolomite. Hard ore mines have been opened on this property at Hammond, Ala. About 2500 acres of mineral lands and 15,000 acres of timber and other lands were acquired with the Clifton furnaces, and 700 acres of ore and other lands with the Etowah furnaces. The company has about 3700 acres of land near Gadsden containing deposits of red iron ore and a large acreage of land containing brown iron ore. Mines have been developed on these properties with a daily capacity of 600 tons. At Hematite, Ga., the company owns 1700 acres of brown iron ore lands with ore washers. Coal mines and coke ovens are operated at Lewisburg, Searles and Brookwood, Ala. There are 215 beehive coke ovens at one place and 350 at another. The total annual capacity of the coke ovens is 300,000

tons. About 300 acres of limestone lands are also owned by the Alabama Co.

The statement has been made that if the pending merger plans are carried out there will be a saving of 40 to 50 cents a ton in the cost of making pig iron, economies being effected chiefly through reduction in the length of ore hauls. Stockholders of the Alabama Co. have already been asked to give their assent to the proposal.

#### Union Sued Under Recent Decision

Suit to recover \$5,000 damages as a result of injuries received at the hands of striking union molders in Cleveland, was brought last week against the Cleveland local of the International Molders' Union of America, under the ruling of the United States Supreme Court in the Coronada case. The president, business manager and secretary of the union were named as co-defendants in the suit which was started by a molder who claimed to be the victim of an attack by union strikers.

#### Decision as to Reconsignment

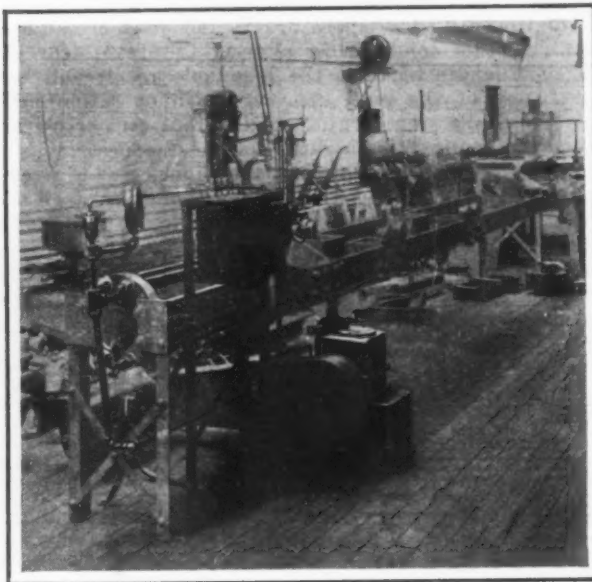
WASHINGTON, July 18.—Passing upon the complaint of the Romann & Bush Pig Iron & Coke Co., St. Louis, Examiner Warren A. Wagner, in a tentative report to the Interstate Commerce Commission, finds not to be unreasonable or otherwise unlawful the reconsignment rule of carriers permitting only one change in destination. It was charged that failure of the Western Maryland and other carriers to permit more than one reconsignment, and apply the through rate from points of origin east of the Mississippi River on shipments of coal and coke by way of the reconsigning points to final destinations in the far west and southwest violated the fourth section of the interstate commerce act.

The Commercial Galvanizing & Mfg. Co., Warren, Ohio, has begun the erection of a new plant in the industrial allotment in the northeastern section of Warren, adjoining holdings of the Warren Tool & Forge Co. It will manufacture large and one-time containers as one of its chief products, used by petroleum companies, tar producers and other manufacturers in transportation of their materials. A galvanizing department will be maintained in conjunction.

### Horizontal Press for General Work

Wide range of ram speeds and unusual readiness of the ram to respond to movements of the control handle are said to permit the new self-contained horizontal press of the Oilgear Co., Milwaukee, shown in the illustration, to be used effectively on many different kinds of work.

The particular press shown is used in the saw mill department of the Allis-Chalmers Mfg. Co. on general work, such as pressing wheels on the axles for saw mill carriages, pressing heads into pipe rollers and a variety of odd jobs. The capacity is 25 tons at pressing speeds varying from  $\frac{1}{4}$  to 6 in. per min. The maximum speed of ram travel out to the work is 37 in. per min.



Self-Contained Horizontal Press for General Work.  
Wide range of ram speeds is a feature

and the return speed is 56 in. Ram speeds are changed instantly by means of the control handle located on the top of the standard variable-stroke QC pump, as shown. The stroke is said to begin without shock, and the push to be steady and without pulsations.

The pump is driven by a 2 hp. constant-speed, electric motor; no accumulator or auxiliary pump being required. Overload relief valves are provided to permit the ram to be driven at full speed against a stop without danger of injury. The cylinder is 9 in. in diameter and at full capacity a pressure of 800 lb. per sq. in. is exerted on the ram piston head. The large diameter of the ram,  $5\frac{1}{4}$  in., and the long guide, is said to eliminate any tendency of the ram to deflect, even on its maximum stroke of 30 in. The axis of the ram is 32 in. above the floor and the space between the stop supports, 24 in. The V-shaped stops provided can be located along the supports at regular intervals and are held in place by heavy steel pins.

Among the advantages claimed for this type of press, are that power is not wasted in maintaining pressure for an accumulator or for pumping fluid through by-pass valves; the power efficiency is high over a wide range of ram speeds; no adjustments are necessary to keep the machine in normal operating condition and it is not damaged by overload.

### Wages of Sheet Mill Workers Advanced

YOUNGSTOWN, July 18.—Tonnage rates of sheet mill workers employed by Middle West makers subscribing to the sliding scale agreement of the Amalgamated Association of Iron, Steel & Tin Workers will be advanced 3 per cent of the base rate, for the July-August period, as a result of the bimonthly examination of sales sheets conducted July 12 at Youngstown.

The average price of Nos. 26, 27 and 28 gage black sheets shipped during the 60 days ending June 30 was disclosed to be \$2.90 per 100 lb., an increase from \$2.80, the average two months before.

Under the new rate, sheet mill employees will be paid 22½ per cent above base, as compared with 19½ per cent in May and June.

The average price indicates that the higher quotations recently prevailing applied only to a small percentage of the total shipments. The current independent sheet market, however, is from \$5 to \$8 per ton higher than the average disclosed by the examination, as quotations range from \$3.15 to \$3.30 on base gage sheets.

Indications therefore point to another advance for affected workers at the next settlement.

The examination also disclosed an average price of \$4.65 for tin plate, per base box of 100 lb. coke primes, unchanged from the settlement two months ago. Tonnage rates of tin mill workers are therefore unaffected and continue at 23 per cent above the base, the same as for May and June.

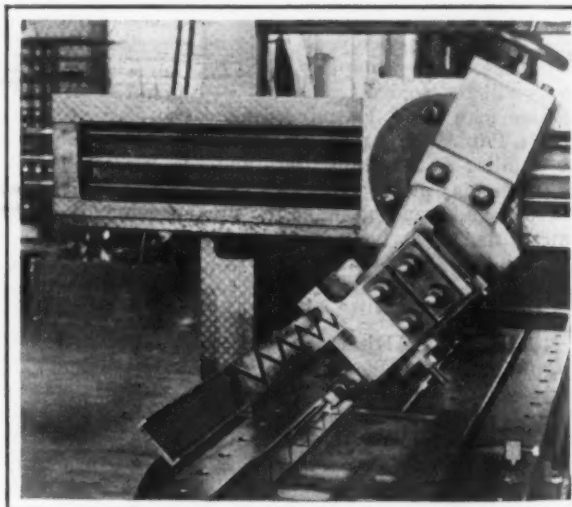
Current tin plate quotations are nominal at \$4.75 per base box, or \$2 per ton higher than the settlement average.

### Ziz-Zag Oil-Groove Planing Attachment

ALLEN P. CHILD

A device used as an attachment on planers, for cutting zig-zag oil grooves in slides, and of interest because of the manner in which it cuts the grooves, is shown in the accompanying illustration. The groove is V-shaped, with a total angle of 120 deg. and because this form gives the oil an opportunity to wedge itself between the wearing surfaces, it is claimed that it is superior to a half-round section groove.

The cutting device is mounted on the clapper of the planer and is locked so that it cannot be lifted. The grooving tool is carried by a small clapper-box mounted on a cross slide, and its position on this slide is adjustable. One end of a bar cam, fitted in the body of the device, is attached to an upright strapped to the planer table so that it moves with the work. Freedom of



Planer Attachment for Cutting Zig-Zag Oil Grooves

movement of the planer head carrying the device is possible to a great extent through connection being made by both horizontal and vertical slides. As the planer table travels, the follower in the cam groove reciprocates and the motion is transmitted to the grooving tool.

Civil service examinations are announced for mining engineers at \$3,600 and upward, and associate and assistant mining engineers at \$2,160 to \$3,600; for junior mining engineers at \$1,620 to \$2,160, and for assistant sanitary engineers at \$2,320 to \$3,225 per year. The two latter classes will be examined Aug. 9; the other applications will be received by the Civil Service Commission, Washington, until further notice. Applicants should ask the commission for form 2118 (mining engineer or associate or assistant) or 1312 (junior mining engineer or assistant sanitary engineer), stating the title of the examination desired.

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ESTABLISHED 1855

# THE IRON AGE

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## A Decision for War

Reading the declaration of some of the coal operators and the official reply of the miners' union to the proposal of President Harding stamps anew on the mind of the reader the intense militancy that so long has marked the handling of labor issues in the coal industry. Some of the published complaints against the Administration that have had the evident sanction of operators find fault because the Government did not put itself behind the operators' proposal to the miners for a new grouping of districts. That is not far from the miners' insistence in their reply to the President that the only thing for the operators to do to avert a catastrophe is to meet the miners' representatives in interstate conference.

If there is to be arbitration of the coal strike, the issues must be handed over to the arbitrators for decision, and in questions so bitterly contested as are those which have caused the present deadlock, the outcome of necessity will be such as will suit neither side. In spite of all that has been said of the necessity of such thoroughgoing work by the proposed commission as shall "establish the proper basis for the future conduct of the industry," it is idle to look for any magic formula to right conditions under which coal mining has been going from bad to worse year after year. The way back will be long and hard, both for operators and miners, even though the war that has already cost many lives were to end tomorrow. Meanwhile, such a commission as the operators failed to support as offered and as the miners' committee rejected outright should be appointed and proceed with its work.

In the phase of the struggle on which the country is now entering the immediate interest of the public is in getting coal from the mines. A majority of the operators have expressed a willingness to have work resumed even though for a time at wages that represent the highest point of post-war inflation. The strikers, while with lip service "alive to the necessity of immediate resumption of coal mining operations," stand opposed to any efforts in that direction except on their own terms. Thus they are arrayed against the public interest and against the Government's

plan for the opening of the mines and must now reckon with opposing forces more powerful than any they have had to meet in all the privation of more than 15 weeks of idleness. The public earnestly wants peace in the coal industry and peace with justice; but it appreciates that the conflict will be more serious before the way can be opened for peace.

## Stand by the President

The patriotism of home is as imperatively necessary as the patriotism which sends soldiers to fight a foreign foe. It is easier to be patriotic when fired by hate of the Hun and love of country than it is to fight one's own countrymen. But Sheriff Duval and his little band who marched up the West Virginia hill were serving the cause of liberty and democracy just as truly as were the American boys who fought in Flanders or the Argonne; for if a man is not free to work in this country without getting permission from a labor union, there is no liberty and democracy is a farce.

Eugene V. Debs, the same Debs who was justly sent to prison for doing his utmost to prevent this country from winning the great war, has now added ingratitude to his other offenses by trying to make it more difficult for President Harding, who pardoned him, to enforce the laws of the United States. Debs sneers at the Government again as he did before a jury found him guilty and, whether legally or not, he is morally as guilty to-day as he was in the time of the other war, for to-day a few men are making war against the sacred rights of all men and Debs is helping them.

When Debs and his kind defy the Government, no patriot ought to hesitate as to where he stands. During that other war in 1917 and 1918, President Wilson and the Labor Board, headed by William H. Taft, made many concessions to labor. It seemed necessary to them to do so because determination to win the war dominated all other considerations. We do not know whether history will say they were right, and it would be useless to argue that question now. Conditions have changed. No one can now claim that in order to establish the right of men to work it is necessary

to submit to the demands of a labor dictator. Temporizing can not go on forever. The time to take a definite, positive stand for principle has come. The wise labor leaders have no sympathy with anarchy and socialism, and a tremendous majority of those who work for wages are patriotic. The President of to-day is in a much stronger position than was the President of 1917-18; but President Harding needs and should receive the heartiest, most effective support possible. Some critics are saying that he did not act soon enough—that he should have acted before the railroad strike and before the coal strike. Possibly that is true; but no good purpose will be served by discussing that criticism. The present duty is to stand by the President in any drastic step he may take.

President Harding has had little more than a year in his great office. He is naturally conservative and slow to act until he knows he is right. In that respect he resembles our greatest President. He is courageous and God-fearing, and will do what the good of the country requires and his conscience commands. To doubt that the people will support him would be to question the stability of our Government.

### Unjust Iron Ore Rates

Early in April of this year THE IRON AGE called attention to the deplorable conditions under which producers of iron ore in Eastern States were laboring, owing to the suspension by the Interstate Commerce Commission of the proposed reduction of 28 per cent in freight rates and handling charges on Eastern ores which had been filed to become effective April 1. At the same time the proposed reduction of 20 per cent on ex-lake rates was suspended, the suspension in both cases extending until July 30. The low rates on foreign ore from seaboard to inland furnaces continued, and operators of Eastern iron mines declared that it would be impossible for them to compete with foreign ores. One Eastern steel company had then contracted for a cargo of foreign ore, and the same company has since contracted for 150,000 tons and negotiations for other tonnages are pending.

Month after month dragged along without the Eastern ore operators obtaining any relief except the general rate reduction of 10 per cent on all iron and steel products, but it was hoped that before July 30 a substantial reduction would be made in the Eastern rates. On Monday of this week, however, the Interstate Commerce Commission suspended until Aug. 29 the tariffs which represented a reduction of 20 per cent on ex-lake ore rates and 28 per cent on Eastern ore rates. It was stated that the suspension was ordered because the commission had not completed its hearing in these cases.

A few concrete examples will show the handicap of the Eastern producers. The pre-war rate on ore from Ringwood, N. J., to Pottstown was \$1.12. This was increased 100 per cent to \$2.24, which continued until the recent reduction to \$2.02. Foreign ore, coming to this country pays less than half of this freight, the usual rate from

seaboard to Eastern furnaces ranging from 90 cents to \$1.

The rate from Buffalo to Hellertown, Pa., over 300 miles, is \$1.94, but the rate from Ringwood to Hellertown is \$2.02. This is one instance of the way the producers of ore in the Eastern States are suffering, not only from foreign competition, but from discrimination in favor of Lake Superior ores which, in many cases, have lower rates on long hauls than the Eastern mines have on short hauls.

Under these conditions it is no wonder that some Eastern mines are idle and have been for months, and that at others production is greatly reduced. The latest action of the commission will insure further losses and further suspension of activities. It is difficult to understand the position that body has taken.

### Magnetic Testing in Welding

The rapid advances made in welding operations have emphasized the necessity for a reliable method of checking the quality of such welds. The joining of ships' hulls, of tanks and of other large steel fabrications by welding instead of riveting is gaining in favor. Investigations have been made recently which have an important bearing on the future of large welding undertakings. At the annual convention of the American Society for Testing Materials last month a paper was presented, abstracted elsewhere in this issue, which makes public some highly interesting results. According to the authors, who compare magnetic and electrical testing of steel welds, the former, as applied to butt-welded steel plates, affords strikingly uniform and reliable results in detecting the quality.

In recent years magnetic testing of steel has acquired large commercial importance, particularly for rails. Only last March its successful application to the testing of chain was made public. Its special advantage lies in the fact that actual metallic contact with the metal to be tested is not necessary, nor even the removal of scale or dirt.

The recent experiments here referred to emphasize the commercial importance of such a method of testing, for if poor welds can be quickly detected then the use of welding may safely be extended. The possibilities are large. There is also the consideration that magnetic testing is really the only means by which the completeness of the heat treatment of a product can be determined without destruction of the object examined. As the applications of heat treatment increase, magnetic testing is certain to gain in importance.

German iron and steel exports have been holding up more nearly to the rate of the second half of 1921 than might be inferred from some reports. The latest data from *Stahl und Eisen* show 200,676 metric tons for April. This makes the average for the first four months of the year 201,800 tons per month, against about 220,000 as the average for the second half of 1921. In the first four months of this year exports from the United

States were only 175,600 tons per month. Great Britain and Germany, therefore, outrank this country. A feature of the German foreign trade is the large importation of scrap. In April the total was 35,120 tons, the largest for any month so far as recent data go, bringing the total to 98,600 tons to May 1, nearly equal to the entire receipt for all of 1921. The necessity of lowering costs by the use of cheap raw materials accounts for this rapidly increasing movement.

### A Better Philosophy of Work

The large labor turnover in most industries, the disposition to go on strike, and the disinclination of many wage earners to do a full day's work, all have a common origin—a philosophy of work that work in itself is objectionable and naturally is to be avoided as far as possible. Recognition of this fact, in the abstract, is probably general enough, but hope that the philosophy of work can be altered and improved is not as great as it should be.

We began our misconception of work as early as we could by misinterpreting a line in what is only the third chapter of the Old Testament: "In the sweat of thy face shalt thou eat bread," and the united testimony of medical men that sweating is healthful has not altered our philosophy of work. Through the centuries the philosophy thrived and "the dismal science," the old political economy, put a broad stamp of approval on it.

It is unnecessary to argue that when workmen demand higher wages and when they shift employment a strong motive is the desire to avoid work, as this fact is commonly admitted. The abstract principle that work ought to be made more pleasant is, moreover, generally recognized. The difficulty lies in the practice, not in failure to observe the principle. The practice tends to the treatment of symptoms rather than to attack upon the disease or cause.

The study must go to the very seat of the emotions that cause work to be considered irksome. The seat is deep in the mind of the workmen, below his consciousness, indeed. As he does not himself understand the mental processes by which work appears irksome to him, it is quite idle to appeal to his judgment. From this viewpoint it is not straining a point to call "collective bargaining" by the simple word foolish. There are various arguments in favor of collective bargaining, and this reference does not combat those arguments. Anything of that sort, done with the avowed purpose of making the surroundings or circumstances of employment more attractive, serves by that very token to emphasize the conception in the mind of the worker that the work itself is disagreeable.

The rather common notion that it is only work of certain descriptions that can be really agreeable to the worker will not bear the test of study. To illustrate, if an instant answer be demanded to the question whether there is joy in the production of an oil painting, the average man will confidently answer in the affirmative, yet questioned further the great majority of men would admit that they would not care to be painters. One has

merely jumped to the conclusion by observing that many men have painted without making a decent living from the work. If some men have put their whole souls into painting and other men would find such work most irksome, is it reasonable to assume that other lines of work cannot become tolerable, even pleasurable, through the creation of a different mental attitude?

If we are not on the threshold of important discoveries and applications, by way of creating a new viewpoint and philosophy of work, instead of attacking symptoms in endeavoring only to improve the surroundings of work, we are most unfortunate. The demand for a "living wage" in terms of commodities that are not available in the aggregate cannot easily be downed. It can be met only by increasing production so that the commodities the "living wage" would purchase at present prices can be had. Otherwise increasing wages merely increases the competition of buyers for the commodities available.

### Cement and Steel

Cement and steel as measures of business activity are much alike in some respects and entirely different in other respects, hence a glance at movements in both materials discloses facts as to business conditions which a study of but one of the materials would not show, just as in algebra a single equation with two unknown quantities cannot be solved, while with two equations complete solution is possible.

Cement is practically altogether a construction material, while steel is only in part a building material. The commodities are wholly different in this, that steel can be and is stocked by distributors and consumers while cement is not. Stocks of cement are necessary, to take care of the wide seasonal variations in consumption, but this stocking is done by the producers, who endeavor to maintain a moderately uniform rate of production, while the rise and fall in stocks takes care quite largely of variations in shipments. The Geological Survey presents monthly statistics of production, stocks and factory shipments, which show that shipments in the summer months may be two, three, or even four times as great as shipments in the winter months.

The use of cement—which nowadays means practically Portland cement—is relatively new. Up through the year 1902 production doubled almost every year or two, that of 1902 being 17,230,644 barrels. Then successive doublings occurred in 1905 and 1910, the increase thereafter being substantial, but reasonably moderate. The best pre-war production was 92,097,131 barrels, in 1913.

Comparing 1913 and 1920 conditions one finds a departure between cement and steel, cement production increasing  $8\frac{1}{2}$  per cent while steel production increased 35 per cent. Comparing 1920 and 1921 we find a greater departure, in the other direction. Cement went off only 5 per cent while steel went off 53 per cent.

These remarkable departures can hardly be ascribed to accident or to changes in conditions affecting the two materials differently. Un-

doubtedly, of course, the activity in road building in 1921 helped cement much more than steel, but that would not account for everything. The statistics furnish strong ground for the suspicion, which is justified also by various other considerations, that there was a large carry-over of steel from 1920 to 1921, whereby the steel consumption of 1921 was much greater than the production.

The figures tend to support the suspicion. The combined output of 1920 and 1921 in steel was precisely double the output of 1913, while in cement the two-year production was 6 per cent more than double the 1913 output. It is much easier to believe there was a large carry-over in steel and manufactures of steel from 1920 to 1921 than to believe that in 1920 everybody was busy using

steel and cement, but in 1921 they confined their attention to cement.

In the present year the shipments of cement have been 13,218,000 barrels in the first quarter and 34,811,000 barrels in the second quarter. Allowing seasonal variation in shipments this year to follow last year, the indicated shipments for the whole of 1922 would be 107,000,000 barrels, or 7 per cent over the record of 1920 and 16 per cent over the amount in 1913. Whatever may be the cause, the relation between production in 1913 and production or shipments this year is approximately the same for cement and steel. The similarity suggests that steel used for construction work and steel used for other purposes are in no greatly different relations from those of the past.

## CONSIDERING FOREIGN IRON

### Quotations Under American Market But No Analysis Guarantee Is Obstacle—Japan Again Buys Rails

NEW YORK, July 18.—Activity in purchases of rails, both T and grooved type, by Japan continues strong, and black sheet inquiries and purchases are on the increase. One black sheet inquiry now current among Japanese houses is for about 600 tons of light gage. The recent inquiry by the city of Tokio for five miles of 92-lb. grooved rails is reported to have gone to the New York branch of a large Japanese import and export house. The tender of the South Manchuria Railway Co. calling for about 6800 tons of 100-lb. rails was placed with Suzuki & Co., 220 Broadway, New York. An American exporter dealing with Japan recently booked an order for 1000 tons of 12-lb. rails, of which 800 tons have already been placed with a mill.

The Imperial Steel Works, Yawata, Japan, has completed construction of its tin plate mill, says a report of the American commercial attache in Tokio. While the estimated capacity of the mill is 20,000 tons annually, the first year's production is not expected to exceed 6000 tons.

The Bancroft-Jones Corporation, Buffalo, N. Y., reports receipt of a contract from the Truxillo Railroad Co., New York, for a number of steel buildings, involving about 700 tons of structural steel, for use in Honduras.

The rising cost of pig iron in the American market is the cause of considerable interest now being shown by consumers in foreign iron. There are prospects of Belgian, French and Scotch iron being brought in. One importer in New York reports that he is offering a pig iron of Belgian origin, analyzing silicon 5 to 6 per cent, and phosphorus 1.80 to 2 per cent, at \$22.25, c.i.f. New York, or other Atlantic port. The greatest obstacle to purchases of foreign irons seems to be the inability or unwillingness of foreign sellers to give a guaranteed analysis.

In a recent report on conditions of trading with Brazil forwarded to the National Foreign Trade Council, New York, the American Chamber of Commerce at Sao Paulo, Brazil, says: "It seems to be generally agreed that the worst of the crisis which has existed for the last two years has passed, but it is also felt that a great deal of care and effort must be exercised before conditions can resume their normal state. However, the situation is far from hopeless, and instances can be cited where customers are ready and anxious to buy American goods, admitting that the price in dollars was all that could be desired, but positively refusing to consider placing an order until exchange has improved. In these cases the importers are not buying European goods, but insisting that they will wait for American."

In referring to the exchange situation, the report

says: "It might be borne in mind that under existing conditions not only is the cost of goods doubled in the local currency, but the importer has also to contend with an increase in duties of approximately 100 per cent, due to the advance in the gold rate. For those with any intention or inclination to invest money in Brazil in the form of local manufacturing, it would seem that the present would be a good time to make a thorough study of the field, especially in view of the high value of the dollar when converted into milreis, the high protective tariff, and the lower investment required in shipping raw materials to Brazil for fabrication as compared with shipping finished products."

Leo H. Marks, who was president of the defunct Marks Steel Supply Co., Cleveland, and who pleaded guilty to concealing assets totaling \$3,500 during a hearing in bankruptcy proceedings, was sentenced last week by Federal Court to eighteen months' imprisonment in the Atlanta penitentiary.

## The Iron Age and Its Readers

An interesting story may be told of the colorful advertisement which appeared on the front cover of the issue of July 13. It is a reproduction of a large painting now to be seen as one enters the offices of the American Rolling Mill Co., at Middletown, Ohio. A desire to have something monumental at the Armco Works to be symbolic of the company's niche in industry resulted in the decision to have a painting of permanence. In securing a representatively virile example of a worker for the picture, some twelve different employees were photographed in the attitude of the heroic figure, and a composite was made of the dozen subjects. When the picture was unveiled under impressive ceremonies, the audience of employees, in response to a request, named correctly eight of the men whose portraits had been used, thus making it possible to say that the worker as well as the works are preserved in the finished picture.

The advertisement itself is noteworthy as the first one on an IRON AGE cover requiring the so-called four-color process. Actually there were five colors, counting the black ink, for the red regularly forming the field of THE IRON AGE heading was not suited to securing a reproduction of the colors of the artist's painting, and another red was needed. Readers may perhaps take the excellence of subject matter and the general rendition of the advertisement as a compliment paid by the advertiser to their discerning appreciation.

# Strike Causes Banking of Blast Furnaces

Four Stacks Now Idle in the Valleys and Others Have  
Difficulty in Operating—Situation in Many  
Centers More Serious

YOUNGSTOWN, July 18.—The question of fuel supply has become the dominant consideration in the iron and steel industry, overshadowing all other current influences. Attention of executives, operating officials and consumers is focused upon this issue and day-to-day developments. Important independents are laying plans for curtailed production, preferring to gradually let down than to consume reserves and then wholly suspend. Allocation of steel supplies to consumers on a pro rata basis looms as an early development.

Four blast furnaces have already been banked in the Mahoning Valley because of the disorganized transportation situation checking coal shipments. Tod furnace of the Brier Hill Steel Co. was banked July 17; the 600-ton stack at Warren, operated by the Trumbull-Cliffs Furnace Co., and supplying hot metal to the Trumbull Steel Co., went down July 16, while two stacks in the Haselton group of the Republic Iron & Steel Co. were banked July 15.

The situation is likewise forcing other curtailments, which promise to become more serious, unless fuel supplies improve.

## Slowing Down Expected

The Youngstown Sheet & Tube Co. started the week with schedules at 80 to 85 per cent. Officials anticipate a slowing down before the week end, however, and characterize the fuel situation as desperate.

Paradoxically, the very seriousness of the situation presents the hope that an early adjustment will be effected. Shopmen's strike proved the last straw in the difficulties under which Southern roads, tapping mining regions in West Virginia and Kentucky, were laboring. Before the shopmen walked out, these carriers, connecting with trunk line roads serving the Valleys and other large consuming districts, were operating in excess of capacity to meet the enlarged demands for coal. This created additional strains on motive equipment and rolling stock and the crippled roads were unable to meet the crisis precipitated by the shopmen's walkout.

The first important independent in this territory to announce suspensions as a result of these developments was the Republic Iron & Steel Co., which on July 15 banked two of the three active blast furnaces in its Haselton group at Youngstown and its Bessemer department. Its Bessemer converters had been blowing only since July 5, when they resumed following a protracted shutdown.

## Coal Shipments Short

Other Valley plants announced curtailments. These interruptions come at a time when the industry was hitting its stride and production of steel was approaching a rate close to normal. They are caused immediately through inability to obtain adequate coal shipments through the rail congestion. Stoppage of fuel supplies occurred almost overnight, and its immediate reflection in lowered schedules indicates dependence of the industry upon transportation.

## Reserves at Valley Plants

Reserves at Valley plants will be conserved as long as possible to prolong at least partial operations. Reduced ingot output, forced by the situation, will curtail

sheet bar supplies and thus cut into rolling schedules of both integrated and non-integrated sheet interests.

The Trumbull Steel Co., Warren, has a stock of cold iron sufficient to carry it along for about 60 days, irrespective of the operation of the blast furnace of the Trumbull-Cliffs Furnace Co., which has been supplying hot metal since Jan. 16 to the open hearth furnaces of the Trumbull company. The company expects to be able to secure enough coal and other fuel to continue operation of its steel plant and finishing departments.

Coal prices have stiffened at Southern mines as indicated by the statement of a large industrial buyer that he was offered coking coal at \$5.50, at the mine, this price representing a horizontal advance of \$2 per ton over previous quotations.

## Proceeding With Caution

Naturally, in view of disorganized conditions, due to the coal and railroad strikes, sales departments are proceeding with caution in accepting future commitments. All business is of course contingent upon early adjustment of transportation difficulties.

Non-integrated sheet producers in the Valley protected on coal, will be compelled to slow down because of reduced volume of sheet bar shipments and will likely be forced into early suspension, unless the situation with makers of semi-finished stock improves.

Interference with outbound shipments of steel has been of minor proportions, especially on the New York Central, Erie and Pennsylvania lines. Ore movement from docks to Valley furnaces has slowed down, but not at all to the extent that coal shipments have been affected.

Comment of industrial executives is that, even if an early settlement is effected ending the shopmen's strike, it will be some time before the steel plants again reach their recent high operating rate, should broad suspensions occur. It is pointed out that it will take some time to restore the Southern railroads especially to a normal operating basis. A shortage of open top cars is predicted and return of coal rationing and lake coal priority under Government control is held probable by some interests.

## Railroads Respond to Appeals in Making Rates

WASHINGTON, July 18.—Concern shown by iron and steel and other industries over the drain being made on their supplies of coal has caused railroads serving them to respond to appeals for fixing of commodity rates where it is necessary to make circuitous hauls because of strike conditions. In order to do this, railroads have been and are getting permission from the Interstate Commerce Commission to establish rates on coal on one day's notice. A number of lines serving important coal regions have found their usual gateways either closed or congested, resulting in the shutting off of the natural and most direct routes for coal shipments to steel and other industries, particularly those in Pennsylvania.

This has made it necessary to ship coal by indirect routes which would call for classification rating, usually sixth class rates, unless authority to establish com-

modity rates were granted. The railroads desiring to serve industries on their lines have been quick to act upon the suggestion of shippers, where the carriers themselves have not taken the initiative to establish the lower rates because of the exorbitant costs that would accrue to shippers on the payment of class rates on coal shipments. As it is, many steel companies are drawing coal from distant sources of production, which are resulting in high delivered charges and further narrowing of margins of profit. The overhead costs of steel companies, it has been pointed out, have greatly increased because of restricted production, brought about by the necessity to conserve supplies of coal. Shipments being received are not adequate to meet requirements and this is making it necessary to draw on stocks, the quantity of which is not known here.

### Reduced Coal Output

The congestion of traffic conditions is referred to by the Geological Survey as a new cause for limiting the production of coal. It is not believed that the production of bituminous coal during the fifteenth week (July 10-15) can exceed 4,300,000 tons. Final reports on the week of Independence Day, the fourteenth week of the strike, show that 3,936,000 net tons of soft coal and 23,000 tons of anthracite were produced. Loadings on Monday, July 10, amounting to only 14,952 cars, were lower than those on Monday in other recent weeks and on Thursday they fell to 11,584, the lowest on any Thursday since mid-April. Districts affected particularly by traffic congestion, were Logan and eastern Kentucky, but in western Kentucky and southwestern Virginia, also, loadings soon began to decrease and by Wednesday even the Pocahontas Tug River and Kenova-Thacker were producing far below normal. In the non-union fields of Pennsylvania and in Alabama and the far West no decrease had been reported up to Wednesday.

### Production of By-Product Coke

To replace the deficit in beehive coke caused by the strike in the Connellsville region and other beehive coke districts, the by-product ovens are now producing at a rate above even the average for 1920. The total output of by-product coke in June was in round numbers 2,580,000 net tons, against a monthly average of 2,565,000 tons in 1920, the record year. The average output per working day was 86,000 net tons, an increase of 5 per cent over the May average. The month's production represented 70 per cent of the aggregate capacity of the ovens. Of the 71 plants in existence, 58 were active and 13 idle.

These statistics are based on reports from 70 plants and include an estimate for the one plant not heard from.

Because of the low production of beehive coke—458,000 tons against a monthly average of 1,748,000 tons in 1920—the total output of all coke was only 3,038,000 tons. This was 70.5 per cent of the monthly average of all coke in 1920.

To make the coke produced, it is estimated, required 4,429,000 tons of coal, of which 3,707,000 tons was used in by-product ovens and 722,000 tons in beehive ovens. The present monthly rate of consumption of coking coal is thus about 1,300,000 tons above the 1921 average, but is still 2,660,000 tons below the average in the year of maximum demand, 1918.

### Drop in Coal Production

Uniontown, Pa., July 15.—The railroad strike will result in a drop in production during the week just closing at coal and coke plants in the Connellsville bituminous region, although figures are not available. The strike of shopmen has affected railroads in the region, particularly the Baltimore & Ohio, which has suffered considerably in movement of both passenger and freight trains. The Pennsylvania was not seriously crippled when West Brownsville and Youngwood crews went out, but late this week Rainey yard shopmen quit. The delays on the Baltimore & Ohio have crippled shipments of coal and coke somewhat.

No improvement has been noted in the coal strike

situation as pertains to the disorder phase. Three men were killed early this week at New Geneva, being shot by LeRoy Lincoln, a guard. The shooting followed trouble at the Atlantic Coal & Coke Co. The victims were striking miners, and large crowds attended their funerals, State police being on hand following a tip that a demonstration was planned. There was no disorder, however. The guard is being held in the county jail pending investigation.

The first big picnic of the striking miners of the region was held at Shady Grove park last Saturday afternoon. There were a number of addresses. The men were told that, if the union men in other fields returned to work following any agreement reached at Washington, they would contribute half their pay to the men in the Connellsville region. Previously the strikers in the local region have been told that the union men would accept no agreement which did not provide for the men in the Connellsville region.

There is growing dissatisfaction in the region although just what form such feeling will take remains problematical. There are increasing tent colonies in the region as strikers and sympathizers who refuse to return to their work are being evicted from company houses.

The number of evictions is being increased daily. Companies in the region are preparing to continue operations. A number of ovens have been put in blast in the Fairchance region. In this territory, the H. C. Frick Coke Co. is continuing its advertisement of \$500 reward for information leading to arrest and conviction of those responsible for dynamite outrages.

As the strike progresses with the striking miners refusing to go back to work and their places being taken by outside men, the situation is becoming increasingly serious. It is true that there is a heavy shifting about of men in the region, workers going to other plants and returning to work while refusing to go back to work at plants where they have resided for years.

### Vigorous Protest Against Illinois Atrocities

Illinois coal operators representing all sections of the state, at a large meeting held at the Great Northern Hotel, Chicago, today, expressed unanimously their "continuing horror and bitterness of feeling over the monstrous atrocities committed near Herrin, Ill., on June 20 and 21, when some 72 employees of the Southern Illinois Coal Co., after their surrender under a flag of truce, were removed from the mining property and a substantial number of them brutally murdered by a lawless mob on the public highways, the remainder being tracked like wild animals through woods and fields in an effort to destroy them all.

That local and State officials, with a full knowledge of the extreme threat of this situation, and in ample time to have prevented such ruthless butchery, took no action to prevent it, is and will remain a stain not only upon the local community but upon the State as a whole until through adequate energy and effort not only the perpetrators but the instigators of this awful crime are apprehended and punished to the fullest extent of the law.

If for any reason, either of politics or because of the domination by any class or group, there shall be failure on the part of the proper authorities to handle this situation promptly and vigorously, it must be apparent to everyone that group lawlessness will be encouraged and become a menace always before the people in every section of the State.

We commend the utterances of President Harding in his address on July Fourth, that "liberty is gone in America when any man is denied by anybody the right to work and live by that work. It does not matter who denies. A free American has the right to labor without any other's leave."

The production of Portland cement for the first half of 1922 is estimated by the United States Geological Survey on the basis of returns from producers at 31,664,000 bbl. against 27,228,000 in 1921. Shipments for the six months of 1922 are 34,811,000 bbl. and for 1921, 27,984,000 bbl.

## GETTING READY TO BUY

### Knowledge of Requirements an Important Element—Flexibility Essential

BY JOHN J. RALPH

**W**HAT is the kind of proposition the sales department respects, goes right after, checks through carefully to see if the bid can be bettered, either in price or in value? The kind it likes to land and is chagrined when lost? In the first place, it is clear cut; in the second, it is complete.

When looking at the specification the seller knows the buyer knows what he wants. He knows what the market affords, for there is margin enough to care for standard variation of material. He knows the quantities he should buy, considering both the plant needs and price conditions. Delivery terms, quality and inspection conditions insure a fair deal. There is a lack of the "cast iron" quality that invites the best efforts to give the best products at the best price.

It is obvious that getting up such a bid is not the duty merely of a purchasing agent or department. It goes back through the entire organization. The files and records of the purchasing department first yield descriptions of the available products and trade information concerning them and names of possible suppliers.

These are considered by the design and manufacturing departments and the relative adaptability is worked out. The sales department also has a hand in it, with a view to the salability of the finished product. The cost department goes over its records, to show the variation in manufacturing cost due to variation in quality.

There are then worked out specifications of the ideal material or machine. There is also worked out an estimate showing at what price it would pay to make the purchase and the effect which lowering the price would have on the quantity that could be bought to advantage at one time.

There will be considered the effect on manufacturing cost of variations of chemical and physical nature from the ideal. Competing materials will be considered and relative prices which would make an equivalent buy roughly computed.

With this information as a basis, the purchasing agent is then ready to go into the market for supplies or machinery. He is able to draw his specifications to permit submission of bids, both of the ideal material as determined by the factory and substitute materials, and obtain intelligent bids from those approached. He has clearly stated the allowable variation in quality, in finish, in size.

#### Bidders Help Solve the Problem

By stating the use, he obtains the assistance of bidders who may have materials or methods available for satisfaction of the need, which the plant information files did not supply, and it may lead to finding a material or machine more satisfactory than the stated shop ideal. The clear statement of the possible quantities the plant may buy may enable one or more competitors, by working out better methods of production, to give a better price without changing the quality.

Bids having been received, it is sometimes possible to decide immediately just what is the best purchase to make.

If the bids give alternatives, they require careful attention by design, manufacturing, cost and sales departments. The investigation will be similar to the preliminary one, but this time will proceed on definite actual figures rather than on estimates. The maximum price that could be paid for the product to make it a money-making purchase having been decided, the relative profits to be made through the use of alternatives can readily be worked out. The bids and the trend of prices will determine the quantity it will pay to buy.

#### Conferences and Investigations

Every department in the plant is interested in the main purchases. The opinion of each department has

a modifying effect on that of every other department. The purchasing agent requires all of this information. When the problem is put up to him in final shape, it should be in just exactly as clear and complete a form as his request for bids or the bids themselves.

It is usual to go over matters in conference taking up the various aspects, but it is not usual to reduce the discussion to writing or to get written reports covering the salient questions as they appear to the various departments. Such reports are essential to the best work by the purchasing agent, for from them he can prepare intelligently his request for bids.

It is possible to carry this, as all other careful work, to a ridiculous limit, but where the fundamental product, manufacturing and design conditions of the plant depend on the purchase, it is impossible to exercise too much care. Reducing the informal discussion to a formal report also has the advantage of impressing on the various departments the fundamental importance of buying, and their part in it.

If this is reduced to a routine there is a tendency, after the initial installation, for it to become machine-like. If so, it is far better to return to the system of individual "hunches," for reliance placed on a precise looking report, which is in reality inaccurate, makes it easy for big mistakes in judgment to occur.

#### Degree of Investigation Warranted

Be the purchase small or large, it has its proportionate effect on the profit sheet, and the elements of the large purchase are the same as the elements of the small one. Training in consideration of the elementary economics of the small purchase, usually prepared and handled by the less important members of the organization, is precisely the development of methods of investigation which they will use later in considering more important purchases.

Small purchases fall in classes and their aggregate runs up to a considerable sum in each class. Each class of purchases needs consideration and decisions should be made as to the relative economy to be reached, and the conditions, for each type of purchase.

The effect on the profit sheet of some of these small purchases is often entirely out of proportion to their money value. Just the substitution of one make and type of tool for another may increase the efficiency of some workman more than enough to pay for the tool in one day.

Here we have, then, the measure of the amount of attention to be paid to any purchase—the resultant economy attainable through more careful consideration. Where the amounts run large, as in the case of raw materials; where the time influence of the purchase is considerable, as in the case of tools and equipment, much attention should be given.

#### Limiting Conditions Often Harmful

It is usual for the purchasing department to be bound by a rule that no purchase shall be made of over a certain sum without the approval of the board of directors.

Right here is the source of much foregone profits. Ask your own salesmen about this, and the times when a shop has been balked of purchasing because of the prejudices of some member of the board, or because of an arbitrary ruling that no more money was to be spent in some direction for a set length of time.

Try to sell a labor-saving tool to some railroad shop or to an institution with a number of plants and a governing central board. Yes, and many a time clever selling to the same source, against the entire sentiment and advice of the shop, has fastened on the manufacturing department costs, with no possibility of profit, that have later proved very embarrassing.

The army philosophy is that the bestowal of rank is the automatic bestowal of ability to fill the position. We can see the absurdity of this in the army, but in industrial ranks it is certain that there is not much of the same feeling?

The urgent necessity for improving buying and for reaching the highest state of that art is beginning to be understood. The basic realization is that, while principles never change, circumstances do, and that under

different circumstances the application of the same principles must always produce different results.

Each problem must be carefully studied and a solution reached in keeping with the facts. The intrusion of personality or personalities almost always means an

imperfect solution. The man who requires purchases made to suit his prejudices is too small to be able to grasp the essentials of real purchasing and if his influence is sufficient it sooner or later spells grave loss to the plant.

## People Expected to Support the President

### White House Calls Upon Executives of 28 States to Do Their Duty—Governor Sproul of Pennsylvania Is First to Respond

WASHINGTON, July 18.—Public approval is expected to be given readily to the drastic step of President Harding to bring about immediate resumption of coal production. The communication addressed to 28 Governors of coal producing States this evening at 6 o'clock in substance provides that they shall make every effort, with the assurance of support from the Federal Government if needed, to see that coal mining operations are started at once. While the communication does not specifically say so, it is plain in making it known that troops or any other means that may be required shall be used to protect mining properties and transportation. The final sentence in the statement of the President is a challenge to strikers or any others who attempt to interfere with coal mining and transportation. "To the task of lawful protection and the maintenance of order the Federal Government pledges every assistance at its command," concludes the communication.

#### Attitude of Labor Unions

In a word, if the States find it necessary to call upon the Federal Government for troops or other means for protection, they will be afforded. Organized labor already has begun a campaign of what appears to be open defiance of the Government. This had been expected and is being disregarded. But the attitude of the Government similarly is directed against coal operators who also refused to accept plans of arbitration.

#### Operators Also Blamed

It is distinctly known that Government officials consider that the tactics of delay, evasion and final refusal to submit to the Government's proposals of negotiation and arbitration, except upon their own terms, by operators, were as reprehensible as those of the miners' union. The outcome of the strife between the Federal and State Governments on the one hand and the organized miners on the other is being watched with eagerness, but the utmost confidence is expressed that, whether the strikers capitulate or not, they have lost their opportunity to resume work on an equitable basis, which by some is considered to be more than equitable for them.

#### All Other Means Exhausted

The Administration did not take its present steps until after it had exhausted every means of peaceful settlement of the strike, but finding they were futile, it has resorted to the only alternative it thinks remained. It has turned to the State governments to remind them that it is for them to assume responsibility in the situation which, it is believed, has been decidedly lacking in many instances. Pledge of the aid of the State of Pennsylvania made by Governor Sproul was the first publicly announced policy of any State and it is expected that the other States will fall in line. Those

that do not, it is stated, will have to submit to Federal action.

In his statement, the President points out repeated efforts of the Federal Government to settle the coal strike and says that their failure left him "no other course but to invite the mine operators to return to their mines and resume activities." A number of operators have said that with sufficient protection they will have no difficulty in getting miners and resuming production. It is also intended to see that transportation is protected, made more difficult because of the rail strike, but it is believed the protection necessary will be easily provided. The President told the Governors that he hopes they will find it consistent to second the invitation to have all miners and operators resume their work, and points out the joint responsibility of the State and Federal Governments.

#### Responsibility Placed

"We are responsible," says the statement, "for the production and the transportation of a fuel supply ample for the necessities of the American people and the public utilities which serve them, particularly the railways engaged in interstate commerce. We must have ample coal to maintain industrial activity, we must have the coal necessary to the health, security and activity of all the people."

In concluding, the statement says:

"It becomes necessary, therefore, in the name of common welfare, to invite production, in the fulfillment of that obligation which attaches to any American industry engaged in providing any public necessity, and to afford security to all men alike who are ready and willing to work and serve the common need. No cause is so important as that of common welfare and there must be the suppression of every unlawful hindrance to the service of that cause. To the task of lawful protection and the maintenance of order the Federal Government pledges to you every assistance at its command."

### Disagreement Does Not Justify Increase of Freight Rates

WASHINGTON, July 18.—Notice has been served upon the railroads by the Interstate Commerce Commission that disagreement over divisions is not considered justification for increases in or cancellation of joint through rates. Calling attention to the fact that it frequently occurs that carriers, unable to agree among themselves upon the division of such rates, propose to cancel or increase the rates, the commission points out to the railroads that under Section 15 of the Interstate Commerce act it has no option other than to condemn such changes unless substantial justification other than dissatisfaction with the divisions is submitted. Almost invariably, it is declared, when there is a lack of justification, the commission suspends such cancellation or increase and after hearing, requires that the schedules under suspension be canceled, continuing the joint rates in effect.

# Iron and Steel Markets

## MORE PLANTS SHUT DOWN

### Fuel Scarcity and Railroad Troubles More Pronounced

#### Pennsylvania Coal Mines May Start—Fuel Oil Being Used at Steel Works

The effect of the coal and railroad strikes in cutting down pig iron and steel production is more pronounced. At Youngstown, Ohio, three large blast furnaces have banked and the Bessemer steel department of the Republic Iron & Steel Co. has closed down. A steel company blast furnace at Warren, Ohio, has stopped, also one at Steubenville, Ohio. At Cleveland the McKinney Steel Co. has banked a blast furnace and at two Cleveland steel plants five open-hearth furnaces are down. Cherry Valley furnace at Leetonia, Ohio, will probably go out this week. In eastern Pennsylvania two Bethlehem blast furnaces have been compelled to bank.

In the Pittsburgh district, all furnaces and steel works active last week have kept going, but steel works and rolling mills have been hampered by delays in coal delivery and some mills have fallen further behind on orders. Railroad congestion and labor shortage in several shops around Pittsburgh have hindered shipments in and out. In other Pennsylvania districts congestion of freight cars at junction points is causing trouble. West Virginia and Kentucky coal roads have been further crippled.

The iron ore movement on the Mesabi range in Minnesota has been reduced 25 per cent and some underground mines have stopped loading ore. While the operating percentage of the steel industry as a whole has not been seriously cut down by the week's events, the strain upon producers is much increased. One large Pennsylvania steel company, in view of the greater difficulty of getting coal, has withdrawn from the market as a seller of finished steel.

Consumers are more concerned about the delivery of steel they have bought, and in many cases their representatives are going to Pittsburgh mills to hasten shipments. New business is falling off, because of increasing uncertainty as to costs and fuel supplies, and on some products higher prices are being asked, particularly bars and plates. Some independent sheet mills have withdrawn all prices and a higher sheet market is predicted.

With coal growing scarcer, some steel plants are substituting fuel oil, though at rising prices. Large oil shipments are going to Youngstown, Ohio, this week, and a central Pennsylvania plate mill has started to use oil in its open-hearth furnaces.

Western Pennsylvania coal mines owned by steel companies or from which steel companies commonly buy coal may see the first efforts to operate in response to the President's proclamation. But railroad conditions must improve before increased coal production can be felt to any great degree, and the outlook at best is for hampered transportation for weeks to come.

Farming out of car and locomotive repairs features the railroad equipment market, but orders for 2300 new cars and 75 new engines were placed. Repair orders of the week cover 7600 cars and 220

locomotives, not counting heavy material purchases by the Pennsylvania Railroad, for use in its own shops, or the numerous small repair jobs negotiated with difficulty.

At Chicago the seasonal falling off in orders from the automobile industry has not yet developed. It now appears likely that there will be little or no gap between the demand for bars from that source and the starting of buying by agricultural implement makers. The latter are expected to be active within 30 days.

The inability of Western steel bar mills to take early delivery business has caused a demand for iron bars, and the latter are up \$2 per ton.

Workers in Central Western sheet mills governed by the sliding-scale agreement will receive for July and August a 3 per cent advance over the base rate, shipments in May and June having averaged \$2 per ton higher than in the previous 60 days. A further advance is already indicated for the next settlement.

In addition to the furnaces which have retired from the pig iron market, having banked because of coke shortage, a number have virtually retired by asking prices far above recent quotations.

Three weeks of July in fabricated steel lettings appears to show 30 per cent falling off from the tonnage awarded for the corresponding period of June. For the entire month of June bridge and building contracts took 66 per cent of shop capacity, according to figures compiled by the Bureau of the Census, while in May 81 per cent of capacity was engaged.

## Pittsburgh

### Fuel Shortage Causes Sharp Reduction in Plant Operations

PITTSBURGH, July 18.—Coal and coke shortage, due to the strikes of miners and railroad shopmen, is now seriously affecting operations of blast furnaces, steel works and general manufacturing plants in the Pittsburgh, Youngstown and Wheeling districts. In Youngstown, the Republic Iron & Steel Co. has been compelled to bank two of its three blast furnaces at Haselton and has closed its Bessemer steel plant at Youngstown. The company is still operating 12 out of its 14 open-hearth furnaces and its skelp and pipe mills are going, but at a reduced rate, and possibly may have to close in part at least within a week unless the supply of coal increases. In the Wheeling district, the Wheeling Steel Corporation banked one La Belle furnace at Steubenville on July 13, and both of its stacks there are idle. The company is operating its top mill and Portsmouth furnaces, but has two stacks down in Wheeling and the Martins Ferry stack is out. So far this company has not been compelled to close down any of its steel mills or finishing departments. In the Pittsburgh district, the Carnegie Steel Co. blew out one Isabella furnace on July 8 for relining, but this was necessary, and was not done on account of the coal strike. The company is now operating 38 out of 59 stacks. The Jones & Laughlin Steel Co. is fortunate in having a fair supply of coal, and has not been compelled to close down any of its blast furnaces, steel works or finishing mills either in Pittsburgh or Aliquippa.

While so far in this coal and railroad critical situa-

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics  
At date, one week, one month, and one year previous

### For Early Delivery

Pig Iron, Per Gross Ton:	July 18, 1922	July 11, 1922	June 20, 1922	July 19, 1921
No. 2X, Philadelphia...	\$27.64	\$27.64	\$27.32	\$21.85
No. 2, Valley furnace...	24.00	24.00	24.00	19.50
No. 2, Southern, Cin'tit...	21.53	21.53	23.00	24.50
No. 2, Birmingham, Ala.†	18.00	18.00	18.50	20.00
No. 2 foundry, Chicago*	24.00	24.00	23.50	18.50
Basic, del'd, eastern Pa...	25.75	25.75	25.00	21.25
Basic, Valley furnace...	24.00	24.00	25.00	19.00
Bessemer, Valley, del. P'gh	26.77	26.77	26.96	22.46
Malleable, Chicago*	24.00	24.00	23.50	18.50
Malleable, Valley	24.50	24.50	24.50	20.50
Gray forge, Pittsburgh...	25.27	25.27	25.46	21.46
L. S. charcoal, Chicago...	31.65	31.65	29.00	36.00
Pertomanganese, seaboard	67.50	67.50	67.50	70.00

Rails, Billets, etc., Per Gross Ton:	July 18, 1922	July 11, 1922	June 20, 1922	July 19, 1921
O-h. rails, heavy, at mill.	\$40.00	\$40.00	\$40.00	\$47.00
Best, billets, Pittsburgh...	35.00	35.00	35.00	33.00
O-h. billets, Pittsburgh...	35.00	35.00	35.00	33.00
O-h. sheet bars, P'gh...	35.00	35.00	35.00	35.00
Forging billets, base, P'gh	40.00	40.00	40.00	38.00
O-h. billets, Phila...	40.17	40.17	40.74	38.74
Wire rods, Pittsburgh...	40.00	40.00	38.00	42.00
Skelp, gr. steel, P'gh, lb...	1.70	1.70	1.70	2.00
Light rails at mill...	1.75	1.75	1.50	2.00

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	1.925	1.925	1.96	2.10
Iron bars, Chicago...	1.90	1.80	1.75	1.90
Steel bars, Pittsburgh...	1.70	1.70	1.70	1.80
Steel bars, Chicago...	1.75	1.75	1.75	2.18
Steel bars, New York...	2.04	2.04	1.98	2.18
Tank plates, Pittsburgh...	1.70	1.70	1.60	1.80
Tank plates, Chicago...	1.75	1.75	1.75	2.18
Tank plates, New York...	2.04	2.04	1.98	2.18
Beams, Pittsburgh	1.70	1.70	1.60	1.85
Beams, Chicago	1.75	1.75	1.75	2.23
Beams, New York	2.04	2.04	1.98	2.23
Steel hoops, Pittsburgh...	2.50	2.50	2.40	2.50

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. \$Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	July 18, 1922	July 11, 1922	June 20, 1922	July 19, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.25
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	4.25
Sheets, blue an'd, 9 & 10	2.40	2.40	2.40	2.50
Wire nails, Pittsburgh...	2.40	2.40	2.40	2.75
Plain wire, Pittsburgh...	2.25	2.25	2.25	2.50
Barbed wire, galv., P'gh...	3.05	3.05	3.05	3.40
Tin plate, 100-lb. box, P'gh	\$4.75	\$4.75	\$4.75	\$5.75

### Old Material, Per Gross Ton:

Carwheels, Chicago	\$19.50	\$19.50	\$18.25	\$12.50
Carwheels, Philadelphia...	17.50	17.50	17.00	16.00
Heavy steel scrap, P'gh...	17.25	17.50	17.00	12.00
Heavy steel scrap, Phila...	15.00	15.00	15.00	11.00
Heavy steel scrap, Ch'go...	15.50	15.50	14.50	10.00
No. 1 cast, Pittsburgh...	19.00	19.00	18.50	16.00
No. 1 cast, Philadelphia...	17.50	17.50	19.00	17.00
No. 1 cast, Ch'go (net ton)	17.00	17.00	15.75	12.50
No. 1 RR. wrot, Phila...	17.00	17.00	17.00	13.50
No. 1 RR. wrot, Ch'go (net)	13.50	13.50	12.50	9.00

### Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$11.00	\$9.50	\$6.50	\$2.75
Foundry coke, prompt...	11.00	10.00	7.00	4.00

### Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	14.00	14.00	13.75	12.75
Electrolytic copper, N. Y.	13.75	13.75	13.50	12.62½
Zinc, St. Louis	5.75	5.52½	5.37½	4.25
Zinc, New York	6.10	5.87½	5.72½	4.75
Lead, St. Louis	5.50	5.50	5.60	4.35
Lead, New York	5.75	5.75	5.85	4.40
Tin (Strait), New York...	31.50	31.12½	31.37½	27.00
Antimony (Asiatic), N. Y.	5.00	5.00	5.10	4.65

### Composite Price, July 18, 1922, Finished Steel, 2.169c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	July 11, 1922, 2.169c. June 20, 1922, 2.141c. July 19, 1921, 2.407c. 10-year pre-war average, 1.689c.
These products constitute 88 per cent of the United States output of finished steel	

### Composite Price, July 18, 1922, Pig Iron, \$23.61 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	July 11, 1922, \$23.61 June 20, 1922, 24.05 July 19, 1921, 19.81 10-year pre-war average, 15.72
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tion there has been no suspension of blast furnaces and steel works in the Pittsburgh district, they are very much hampered in operations by the scarcity and delay in delivery of coal to the plants by the railroads, which have been intensified by the railroad strike. This has brought about a restriction in output, and the steel works and finishing mills are steadily getting further behind in deliveries. Consumers are getting very anxious about deliveries of materials they have bought, and are hounding the mills for shipments. Some representative consumers have men in this district at the different plants from which they have bought material, who are using every effort they can to expedite shipments.

The Baltimore & Ohio Railroad seems to have been hit harder by the strike than any other of the trunk lines entering this district. This road has already cancelled excursion trains and several of its through trains, especially those running into West Virginia and other southern territories. The Pittsburgh & Lake Erie has been seriously affected by the walkout of shopmen at its McKees Rocks shops which at noon on Monday virtually suspended operations. The McKees Rocks shopmen are members of the American Federation of Railroad Workers, an independent labor

organization that did not join the strike when it was called on July 1. They now claim that the Pittsburgh & Lake Erie Railroad was sending Baltimore & Ohio trains over its tracks, and they refused to permit this to continue, and went out on strike. The Pennsylvania Railroad claims that many of its men are returning to work. This railroad has brought in some strike breakers, some of whom quit when they realized the situation. The Erie Railroad has applied to the deputy United States marshal to protect the men in the shopmen's strike, this protection being asked in Erie, Crawford and Venango counties. The Erie Railroad has been crippled by the shopmen's strike at its shops at Meadville, Pa., which are doing little work.

Steel companies are scanning orders closely, turning down promptly any business coming from other than regular customers, and in many cases paring down considerably orders that their regular customers are trying to place. Prices show a decided upward tendency and sales of steel bars at 1.80c. are being made regularly, while it is claimed that plates have been sold as high as 1.90c. at mill. The situation now in finished steel products is that it is not so much a question of prices, but whether the mill can make the delivery wanted.

**Pig Iron.**—The local market is quiet, and with some furnaces already out, and a strong possibility that others may have to go out, on account of not being able to get shipments of fuel, the market is expected to take an upward turn in prices, but has not yet done so. A local open-hearth steel concern sent out an inquiry two or three days ago for 5000 tons of basic, and is reported to have already closed for the iron with a Valley furnace at \$24 at furnace. There is no demand for Bessemer or malleable, and sales of foundry have dwindled down to carloads and lots up to 200 tons. One interest reports a sale of 250 tons of No. 2 foundry at \$24 at Valley furnace. One maker of basic is selling at \$24 Valley furnace. Another maker of basic is holding for \$25, Cleveland, freight added for delivery to any point, but has not sold any iron as yet at this price. Unless the coal and railroad strikes are quickly settled, a number of steel works and merchant blast furnaces will have to go out or bank, as supplies of coke and other fuels are steadily getting scarcer, the railroads being unable to move them. Two stacks in the Shenango Valley and two or three in the Mahoning Valley are on the ragged edge for coke and may possibly have to bank this week.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.77 per gross ton:

Basic .....	\$24.00
Bessemer .....	25.00
Gray forge .....	\$23.50 to 24.00
No. 2 foundry .....	24.00
No. 3 foundry .....	23.50 to 24.00
Malleable .....	24.50

**Ferroalloys.**—The local market is not active, as consumers of ferromanganese have apparently covered their needs for some months and are out of the market. A few sellers are quoting prompt ferromanganese at \$70, Atlantic seaboard, for either British or domestic, and several small sales have been made at that price.

We quote 78 to 82 per cent ferromanganese, \$67.50 c.i.f. Atlantic seaboard for domestic; British, spot, \$70; British, future, \$67.50; German, 76 to 80 per cent, \$66. Average 20 per cent spiegeleisen, \$36 furnace; 16 to 19 per cent, \$35 furnace; 50 per cent ferrosilicon, domestic, \$55 to \$60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$41.50; 11 per cent, \$44.80; 12 per cent, \$48.10; 13 per cent, \$52.10; 14 per cent, \$55.10; silvery iron, 6 per cent, \$30; 7 per cent, \$31; 8 per cent, \$32.50; 9 per cent, \$34.50; 10 per cent, \$36.50; 11 per cent, \$39; 12 per cent, \$40.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is \$4.96 per gross ton.

**Iron and Steel Bars.**—There is no let-up in the demand for steel bars, which is very heavy, and mills are considerably back in shipments. The Carnegie Steel Co. is reported filled up for two or three months and is accepting orders only for indefinite delivery at 1.60c. at mill, for favored customers. Independent mills are quoting steel bars from 1.70c. to 1.80c., but are scanning orders closely, not desiring to take on any orders they can avoid, and at the same time serve regular customers. The demand for iron bars is fairly active, with prospects of higher prices very soon, owing to higher labor costs.

We quote steel bars rolled from billets at 1.70c. to 1.80c.; reinforcing bars, rolled from billets, 1.70c. to 1.80c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.20c. in carloads, f.o.b. mill, Pittsburgh.

**Structural Shapes.**—No large structural jobs have been placed here lately, and inquiry is light. The two local mills that roll shapes are filled up over the next two or three months, and are declining to quote, except to favored customers, and then only for indefinite delivery. Prices quoted on current order range from 1.60c. to 1.80c., depending entirely on the customer, the size of the order and the delivery.

**Steel Rails.**—Two local companies that roll light rails state that demand in the past week has been more active, and report closing contracts for 5000 tons or more of 25 to 45 lb. sections at 1.75c., base at mill. With the serious condition existing, owing to the railroad strike, it is likely some railroads will ask the mills to defer shipments until the situation has cleared up. Two trunk lines entering this city have already suspended shipment on all track materials.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c. base; rolled from old rails, 1.60c. to 1.65c. base; standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

**Wire Rods.**—The demand for wire rods is reported as fairly active, but the available supply is limited. Due to the constantly decreasing supply of coal on account of the strike, makers of rods will not sell for delivery very far ahead. The American Steel & Wire Co. continues to quote soft common rods at \$40 Pittsburgh, and another local maker having in view the probable higher cost of coal, is now quoting \$43, Pittsburgh, but is not anxious to sell very many rods even at that price. Another leading maker here is declining to book orders for rods, desiring to conserve its supply for use in its wire and wire nail mills. An inquiry came in the market recently for 1200 to 1500 tons of soft rods, but it has not yet been closed. So far as known, almost no new orders have been taken as yet at above \$40, at makers mills.

We quote No. 5 common basic or Bessemer rods to domestic consumers \$40, chain rods \$40; screw stock rods, \$45; rivet and bolt rods and other rods of that character, \$40; high carbon rods, \$47 to \$50, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

**Wire Products.**—Considering that this is usually the dull season of the year, the present heavy demand for wire and wire nails is remarkable, and is caused largely by the fact that jobbers and consumers are afraid of future supplies, due to the coal strike, also realizing that prices of wire nails are low, and they are anxious to stock up as largely as possible. The American Steel & Wire Co. is reported to be slow in delivery of wire nails, and has heavy obligations on its books. This condition allows a good deal of business to go to the independents that can make fairly prompt shipments, and they are taking orders freely. All the independent makers are now quoting wire nails at \$2.40 base, having found it impracticable to get a higher price than was being quoted by the leading interest. Specifications against contracts are good, but the mills are slow to take on obligations, owing to their constantly dwindling supplies of coal. One large maker of wire nails reports it has a full supply of coal until Sept. 1, but unless the strike is settled before that date, it will have to close down its mills, in part at least. The demand for wire and wire fence is reported active, and for the latter has been enlarged by the recent reduction in prices of \$5 per ton, which all makers met promptly. We now quote wire nails at \$2.40 base and plain wire at \$2.25 per 100-lb. at mill. Detailed prices on wire products and woven fence are given on page 183.

**Cold-Finished Steel Bars and Shafting.**—While some effort has been made to advance the market on cold-rolled bars to 2.25c, it has not developed very far, the leading maker here continuing to quote cold-finished steel bars at 2.10c, but it is stated one or two other makers are quoting 2.25c, so far without securing very much new business. The tendency of makers is not to sell very far ahead on account of the uncertainty as to the supply of coal, and the certainty of higher manufacturing costs if the coal strike should continue for some considerable time. Makers here are able, so far, to ship out promptly, except in the case of small rounds, in which there is some delay in delivery. Ground shafting is firm at 2.50c base, f.o.b. mill in small lots, 2.60c in less than carload lots. Demand is fairly active.

**Cotton Ties.**—Reports from several local makers of cotton ties are that the bulk of the business for the 1922 season is already on the books and that future sales will be confined to small lots and repeat orders from large users who may not have covered their full needs. No figures are available as to the tonnage in cotton ties for this year, and this will not be known until the full size of the cotton crop is determined. While some comment has been made that \$1.10 per bundle of 45 lb. is a low price, there has been a shading of this price to \$1.07 to very large users. We quote cotton ties at \$1.10 per bundle of 45 lb. for July shipment, with a carrying charge of 1c per bundle for each month thereafter.

**Rivets.**—The demand for rivets from car builders is active, but from boiler shops it is only fair. Makers say that owing to higher prices for coal and for rods

and steel bars, they ought to be getting higher prices for rivets, but so far no move has been made with this in view. Makers are pretty well covered on rods at \$38 or less, and on steel bars at 1.60c, but when they have to again enter the market for these materials, they will probably have to pay higher prices. The market is very firm and any change is likely to be to a higher market. Prices and discounts are given on page 183.

**Plates.**—Inquiries for plates in the past week have taken a spurt, and the leading interest has closed for 5000 tons for car repair work for the Pennsylvania Railroad, and expects to close in a few days for a much larger tonnage for 35 locomotives to be built by the Baldwin Locomotive Works for the Baltimore & Ohio Railroad. Inquiries for the plates and other materials for these locomotives were received here yesterday. The Carnegie Steel Co. is still quoting 1.60c. on plates for such deliveries as it can make, but has made some sales at 1.65c. to 1.70c., at mill. Independent mills are quoting plates all the way from 1.70c. to 1.90c., the price depending on the customer and the delivery wanted. A mill in the Wheeling district reports having sold sheared tank plates on the basis of 1.90c., Pittsburgh, for fairly prompt delivery. Prices are given on page 183.

**Tin Plate.**—This month and August are the peak months for the canning of fruit and vegetables, and makers of food containers are urging the mills for shipments of tin plate, one leading can maker having had a man here for some days. Operations among the tin plate mills have slowed down, the American Sheet & Tin Plate Co. operating this week to only about 70 per cent, the independent mills also showing a falling off, not only in operations but in output. Heavy stocks of tin plate are piled up in warehouses of the mills, which they are unable to move to customers, owing to the shortage of labor and the congested condition of the railroads. There is no change in prices, which are given on page 183.

**Track Equipment.**—The railroad strike is regarded as in a more serious condition today than at any time since it started, but in spite of this, two large inquiries from railroads for spikes have come into this market in the past week. The Southern Pacific has an inquiry out for 2500 kegs and the Erie for 5000 kegs. General demand for large spikes has been fairly active, but is likely to fall off as most railroads have covered their needs for this year, and also on account of the railroad strike. The demand for small spikes is active. Prices are firm and we continue to quote large spikes at \$2.25 per 100 lb. and \$2.50 for small and large and bolt spikes. A leading maker here continues to quote \$2.35 for large spikes, but is quoting the above named prices on small spikes. There is a good demand for track bolts, the minimum price on which is \$3 base, per 100 lb. on good orders. It is said the recent advance of \$5 per ton on tie plates is holding firm, and we now quote these at \$2 to \$2.25 per 100 lb. maker's mill. Detailed prices are given on page 183.

**Billets and Sheet Bars.**—A week ago it was comparatively easy to obtain billets or sheet bars for fairly prompt shipment, but to-day the reverse is the case, and several mills that have been offering both billets and bars in the market now say they have none to sell, owing to the uncertainties of the situation as regards supplies of coal and coke. A local company reports a sale of 500 tons of sheet bars at \$35, Pittsburgh, and 200 tons of small billets at the same price.

**Iron and Steel Pipe.**—The coal strike is embarrassing pipe mills more now than at any time since it started, and is restricting output to a considerable extent. This is naturally increasing costs somewhat, but as yet there are no indications of an advance in prices on either iron or steel pipe at an early date, this being regarded as an inopportune time to advance prices on account of the present serious labor troubles. The demand for butt and lap welded sizes of iron and steel pipe and also for line pipe is heavy, and the mills are inclined to go slow in taking on obligations on account

of the uncertainty of future coal supplies. Several local makers report that on both butt and lap-welded sizes they are filled for three to four months, and are slipping back in deliveries owing to their output being curtailed. There is a better demand for oil country goods which are moving out freely. The order for six miles of 12-in. plain end line pipe for the Union Natural Gas Co. was placed with a local mill. Demand for butt welded sizes of pipe is probably the heaviest ever known, much of the tonnage going into building operations which are active all over the country. A further curtailment in production of pipe is looked for, unless there is soon a settlement of the coal strike. So far the railroad strike has not interfered seriously with shipments, except that some mills report shortages in cars on several days last week. Discounts are given on page 183.

**Hot-rolled Strips.**—Two local makers say their demand has been active in the past week or two, both consumers and jobbers desiring to stock up as largely as possible in view of restricted supplies in case the coal strike is prolonged. At the same time, it is a fact that the demand from consumers for strips to go into early use is active, and the tendency of the market is upward. A good part of the present demand comes from the automobile builders, who are putting the material into cars about as fast as they receive it. It is said that on the narrow light gages of hot-rolled strip steel, a modest advance over the base price is being paid in some cases. We quote hot-rolled strips at 2.50c base, Pittsburgh.

**Steel Skelp.**—Demand is reported active with available supply very light. One large user that was formerly a buyer in the open market is running its own skelp mill and making practically all it needs for its pipe mills. Prices are firm with a tendency to advance on account of the higher costs of coal and other manufacturing charges. We quote grooved and sheared skelp at 1.70c. to 1.80c. at mill, depending on the order.

**Cold-rolled Strips.**—Local makers report specifications against contracts in the past week have been more active, showing a desire on the part of users and jobbers to increase their stocks, in view of the uncertainty of ample future supplies. The market is firm at 4c. base, Pittsburgh, for cold-rolled strips, and several local makers say if manufacturing costs continue to increase, they will have to advance their prices.

**Nuts and Bolts.**—Jobbers and consumers alike bought heavily for the present quarter, and are specifying freely against contracts, but the demand since the first of this month has been quiet. Owing to the uncertainty of future costs, none of the local makers of nuts and bolts will sell for fourth quarter. Most of the demand at present is coming from automobile builders and from car shops. Discounts as adopted late in June are given on page 183.

**Coal and Coke.**—The situation in the coal strike from the standpoint of production, and also for an early settlement of the strike, are worse to-day than at any time since April 1, when the coal strike started. The facts as to the strike are given elsewhere in this issue. We now quote both blast furnace and foundry coke at \$11 per net ton at oven. Connellsville steam coal is \$5 at oven and West Virginia coal from \$4.50 to \$5 per net ton at oven.

**Sheets.**—Leading mills are sold up on sheets to October, and production has been very much curtailed, due to the coal and railroad strikes. Owing to the serious situation, some independent mills have withdrawn all prices, and others may do so soon unless the situation quickly clears up. This week the American Sheet & Tin Plate Co. is operating to 83 per cent of sheet mill capacity, but reports that production is very much curtailed, owing to scarcity of men, and inability to get coal promptly. Several of the large automobile builders have had men here for more than a week trying to accelerate shipments. Unless the coal and railroad strikes are soon settled, higher prices for sheets

(Continued on page 182)

## Chicago

### Little Trouble Due to Shopmen's Strike, But Future Curtailment Feared

CHICAGO, July 18.—While not yet a curtailing factor in iron and steel plant operations in this district, the strike of the railroad shopmen does loom up as a possible restrictive influence later. The railroads tributary to this city, with one or two exceptions, lately have been scurrying around in an effort to find private shops which will do car repair work, ordinarily performed in their own shops. One system even has gone so far as to offer to send its loyal workers to a plant in the city in an effort to get this plant to take on the contract. Generally, the jobs involved are too small to interest the car builders and it begins to look as though a great number of cars would not be available for the heavy demands of the crop moving period and should the demands for cars for coal shipments be large at the same time, it is declared with some positiveness, a shortage of equipment could hardly be escaped.

So far complaints of delays to shipments as a result of the shopmen's strike are not numerous. And the plants in this territory, as yet, are not suffering from the fact that fuel is not abundant, except that more capacity would be engaged than now is the case if the uncertainty as to fuel supplies were removed. The Steel Corporation plants here are running slightly in excess of 84 per cent of capacity, or substantially at the same gait as last week, and there has been no particular change in either direction as far as the independents are concerned. Railroad supplies, track equipment in particular, still are in brisk demand and there has not yet been any perceptible slackening in the automotive demand for steel bars. As a general proposition, however, this market is quieter than it has been. As typified by mill order books and the specification coming to the manufacturers against orders, business still is good, but it is pretty generally admitted that new inquiries are fewer and this occasions considerable surprise, since the ordinary signs point so generally to a tighter, rather than an easier, supply situation later in the year. Mills here are not particularly eager for business. This usually gives a market a quiet appearance and in addition, buyers probably are waiting on definite results from the labor troubles before mapping out their policies.

Price changes have been few, but generally the market is firm, about the only exception being sheets and in this product the situation is easier chiefly as to supplies and this means that buyers do not have to pay more than the Steel Corporation prices. Bar iron has moved up in this market to a minimum of 1.90c.

Intimations of a possible increase in wages of steel plant labor are heard here, but the common belief is that if such a step is taken, it will not be until after the coal and railroad strikes are out of the way.

**Pig Iron.**—Demand has been light and sales small except for a couple of lots of Southern foundry, one of about 2000 tons and the other of 4000 tons, sold to local melters on a basis of \$18, Birmingham, for No. 2 grade. Incidentally, this business marked the passing of that price, as the company which lately has been naming it to-day advanced to \$18.50. In general, melters have shown little interest beyond their immediate requirements. Outside of the stiffening in the minimum price on Southern foundry iron, prices are unchanged, but the market is best described as firm, since available supplies are moderate and costs are high, and must remain so as long as the coal strike is unsettled. The trade is much interested in the further reductions in pig iron freight rate from the Birmingham district, which Southern roads have asked the Interstate Commerce Commission to sanction. The proposed new rates would be \$3.53 to Cincinnati and Evansville as against the rate which became effective July 1 of \$4.05 to those points, while the proposed rate to Louisville is \$3.24 against \$3.72 at present and to St. Louis \$4.22 against the present rate of \$5.17. The failure of Northern roads to concur in the suggestion of Southern roads, however,

means that the combination rate from Birmingham to Evansville to Chicago, would be \$6.13 as against the present through rate of \$6. If Southern iron can get into St. Louis as cheaply as is indicated by the proposed tariff, it might for a time be disturbing to Chicago district furnaces now serving that market. Either Southern prices would have to move up or Chicago prices decline to restore the normal relation.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago.....	\$31.65
Northern coke, No. 1, sil. 2.25 to 2.75.....	\$24.50 to 25.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25.....	24.00 to 25.00
Northern high phos.....	24.00 to 25.00
Southern No. 2.....	24.50 to 26.00
Malleable, not over 2.25 sil.....	24.00 to 25.00
Basic.....	24.00 to 25.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free.....	34.00 to 35.00
Slivery, sil. 8 per cent.....	37.29

**Ferroalloys.**—Activity is lacking in all materials, but recent prices hold and in ferromanganese for early delivery the market is slightly firmer. Spot tonnages of this material, all of British origin, now are held at \$72.50, New Orleans, or \$80.06 delivered this district. For future shipment \$67.50, seaboard, still is possible.

We quote 78 to 82 per cent ferromanganese, future, \$75.06; prompt, \$80.06, delivered; 50 per cent ferrosilicon, \$55 to \$62.50, delivered; spiegeleisen, 18 to 22 per cent, \$46 delivered.

**Bars.**—The expected falling away in the demand for steel bars from the automotive industry has not yet developed; indeed, surprise is expressed over the way demand from this source holds up. It now looks as though there would be no considerable lapse between the passing of the automotive demand and the starting up of buying by agricultural implement manufacturers, who are expected to be active within the next 30 days. The mills in this territory all are heavily committed and are discouraging new business, unless buyers are willing to accept delivery at their convenience. Demand is essentially for early deliveries and inability of makers to take such business has occasioned increased demands upon makers of iron bars to replace steel. The market is stronger on iron bars, which now are quoted at 1.90c., Chicago, minimum, and even 2c. on small and less desirable business. These prices compare with the recent range of 1.80c. to 1.85c. Labor and fuel costs, as well as the heavier demand, account for this advance. Hard bars are firm at unchanged prices.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.90c. to 2c., Chicago; rail carbon, 1.70c., mill or Chicago.

Jobbers quote 2.48c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.40c. for rounds and 3.90c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.35c. base. Hoops, 3.48c. Bands, 3.23c.

**Bolts and Nuts.**—New business is exceedingly light, due to the fact that buyers generally got under cover at the prices in effect prior to July 1. On such business as is coming out, however, the new discounts are closely observed. The discounts given on page 183 are those applicable to this territory, except that they are figured on a Chicago instead of a Pittsburgh base.

Jobbers quote structural rivets, 3.10c.; boiler rivets, 3.20c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to  $\frac{3}{4}$  x 6 in., 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, \$3.25 off; blank nuts, \$3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

**Wire Products.**—New demands show a seasonable paucity, particularly from the agricultural regions, where the farmers are busy afield and making few purchases. The leading interest is well sold ahead and is not making much progress in reducing its obligations, owing to the fuel situation and the fact that labor is rather short, and, as usual at this time of the year, not

particularly efficient. Independent companies generally are meeting the Steel Corporation prices, though usually asking \$2 a ton more on all products except plain wire. Mill prices are given on page 183.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, \$3.10 per 100 lb.; No. 9 and heavier bright basic wire, \$3.25 per 100 lb.; common wire rails, \$3.25 per 100 lb.; cement coated nails, \$2.75 per keg.

**Sheets.**—Inquiry is considerably less than it was recently, but makers note no material diminution in the demand as typified by specifications on orders. The Inland Steel Co. is pretty well sold up against third quarter production, but while not actively seeking further obligations, it does occasionally manage to slip in a little additional tonnage for regular customers. Several Eastern mills, which did not fill up on third quarter business in the belief that prices would advance, now are taking business at the Steel Corporation bases of 3.15c. for black, 4.15c. for galvanized and 2.40c. for blue annealed, all f.o.b. Pittsburgh. Indeed, as far as this territory is concerned, there does not seem to be much basis for higher quotation, based on sales.

Mill quotations are 3.15c. to 3.30c. for No. 28 black, 2.40c. to 2.50c. for No. 10 blue annealed and 4.15c. to 4.30c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote blue annealed, 3.63c.; black, 4.45c.; galvanized, 5.45c.

**Structural Material.**—There is a very steady demand for small tonnages, both against structural projects and for stock and since none of the local mills can promise deliveries in quicker than 90 days, more or less business is going to Eastern mills, some of which are in shape to make fairly early shipment. Prices here hold unchanged at from 1.75c., as quoted by the Steel Corporation subsidiary for indefinite delivery, up to 1.85c., as quoted by some of the independents. These prices are well below the delivered prices of Eastern mills, but willingness to pay merely emphasizes the inability of local mills to take on prompt tonnages. No big structural lettings have come out here lately and the common opinion is that there will not be many during the next 30 or 60 days, ordinarily a quiet period, although all companies are figuring upon a large number of projects.

The mill quotation on plain material is 1.75c. to 1.85c., Chicago. Jobbers quote 2.58c. for plain material out of warehouse.

**Cast Iron Pipe.**—Considerable business still is pending, but actual orders are not especially numerous. Makers are to be well filled up as a result of the liberal bookings of the past two months and are less eager for business at current quotations. Mitchell, S. D., has asked for prices on 300 tons of 4- to 10-in., and Belle Plain, Iowa, on 200 tons of 6-, 8 and 10-in.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$49.70 to \$50.70; 6-in. and above, \$45.70 to \$46.70; class A and gas pipe, \$3 extra.

**Reinforcing Bars.**—The Inland Steel Co., Chicago, has taken 1100 tons for the Grant Park Stadium, Chicago. The Corrugated Bar Co. will furnish 500 tons for a Government hospital at St. Louis. New inquiries are fewer than they have been.

**Coke.**—Prices of by-product foundry grade range at \$10.75 to \$11.25, delivered Chicago. These prices are the same as those of a week ago.

**Plates.**—Not only are local makers as heavily committed as they wish to be, but the indications are that this condition is going to continue, because the railroads still have pretty ambitious programs for the remainder of the year, both as regards new cars and repairs to old ones. Pending inquiries are reported to exceed 15,000 new cars and the number of old cars to be put into the shops in the next few weeks is even greater than that total. Since the railroads are anxious to avoid shortages, or at least minimize them, during the period of heavy coal and crop movements, it is likely that much of this business will be let promptly. There is not much demand for plates for tanks or structural work at present. The maker quoting 1.75c. is not able to make early deliveries and the higher quotations

also refer to deferred shipments. The Inland Steel Co. is holding to 2c. base, Chicago, for light plates.

The mill quotation is 1.75c. to 1.85c., Chicago. Jobbers quote 2.58c. for plates out of stock.

**Rails and Track Supplies.**—Evidently, the coal mine operators are expecting an early termination of the strike, as local interests lately have been getting a good many inquiries for light rails and track supplies from this source. The railroads are ordering steadily of spikes, angle bars and bolts, but are not taking on many tie plates. Prices are stronger on spikes and bolts, with 2.25c. to 2.35c. base, Pittsburgh, now quoted by leading makers and track bolts held at 3.25c. to 3.35c. base, Pittsburgh.

Standard Bessemer and open-hearth rails, \$40; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.

Standard railroad spikes, 2.25c. to 2.35c., Pittsburgh; track bolts with square nuts, 3.25c. to 3.35c., Pittsburgh; tie plates, steel and iron, 1.85c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

**Old Material.**—Prices continue to move upward in this market, notably so on those grades finding other than steel works use, and particularly on the light material for blast furnace use. Offerings of scrap by the railroads are not at all heavy, nor is much country scrap reaching the market; meanwhile, dealers hesitate to let go of yard holdings at current prices. Prices might advance if there should be an early termination of the coal strike, thus removing the restrictions on steel works operations which the lack of big reserve coal stocks entails. But it may be argued that the end of the coal strike will mean an ample supply of coke and an increased iron production and the displacement of scrap by pig iron. Rerolling rails are up at least 25c. a ton, as a result of a better demand inspired by the improved outlook for light rails and reinforcing bars. There seems to be little heavy melting steel available at less than \$16 per gross ton. We advance prices on practically all materials sold on a per gross basis on an average, about 50c. per ton. Cut forge and No. 2 wrought grade are going frequently as steel and command more money. The Northern Pacific list, on which bids close to-day, contains 1500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails .....	\$18.50 to \$19.00
Cast iron car wheels.....	19.50 to 20.00
Relaying rails .....	22.50 to 27.50
Rolled or forged steel car wheels....	18.50 to 19.00
Steel rails, rerolling.....	16.25 to 16.75
Steel rails, less than 3 ft.....	17.50 to 18.00
Heavy melting steel.....	15.50 to 16.00
Frogs, switches and guards cut apart	15.50 to 16.00
Shoveling steel .....	15.00 to 15.50
Drop forge flashings.....	11.50 to 12.00
Hydraulic compressed sheet.....	13.50 to 14.00
Axle turnings .....	13.50 to 14.00
Per Net Ton	
Iron angles and splice bars.....	17.50 to 18.00
Steel angle bars.....	14.75 to 15.25
Iron arch bars and transoms.....	18.00 to 18.50
Iron car axles.....	22.50 to 23.00
Steel car axles.....	15.50 to 16.00
No. 1 busheling.....	12.00 to 12.50
No. 2 busheling.....	6.75 to 7.25
Cut forge .....	13.75 to 14.25
Pipes and flues.....	10.50 to 11.00
No. 1 railroad wrought.....	13.50 to 14.00
No. 2 railroad wrought.....	13.75 to 14.25
Steel knuckles and couplers.....	16.25 to 16.75
Coil springs .....	16.50 to 17.00
No. 1 machinery cast.....	17.00 to 17.50
No. 1 railroad cast.....	16.00 to 16.50
Low phos. punchings.....	15.00 to 15.50
Locomotive tires, smooth.....	13.00 to 13.50
Machine shop turnings.....	8.50 to 9.00
Cast borings .....	11.50 to 12.00
Stove plate .....	14.50 to 15.00
Grate bars .....	13.50 to 14.00
Brake shoes .....	14.00 to 14.50
Railroad malleable .....	15.50 to 16.00
Agricultural malleable .....	15.50 to 16.00

Obstacles have been encountered in completing the merger of the Electric Alloy Steel Co., Youngstown, Ohio, and the Atlas Crucible Steel Co., Dunkirk, N. Y., which was recommended by directors of both companies. Additional meetings of interested parties have been recently held, but no definite conclusion has been reached. Opinion is voiced, however, that the merger will eventually be consummated.

## Philadelphia

### Buying Declines Sharply—Furnace and Mill Operations Curtailed

PHILADELPHIA, July 18.—The combination of the coal and railroad strikes is beginning to have a serious effect upon the iron and steel industry. Not only has buying slumped considerably, but operations also are being affected with the prospect that the situation will become worse before the efforts of the Administration at Washington to restore mining and railroad transportation shall have become effective. The troubles which have arisen within the past few days are due mostly to railroad congestion and the inability of the roads to keep cars moving from the mines to points of coal consumption. Among the roads which tap Eastern territory, the Baltimore & Ohio, the Chesapeake & Ohio and the Norfolk & Western are the most seriously affected, and, where possible, shipments are being routed over the Pennsylvania and Philadelphia & Reading, which are comparatively free from trouble. The agreement which the Pennsylvania has just concluded with its men will undoubtedly clear that road of difficulties, while the Reading has had no strike on its lines. Congestion of freight cars at junction points is beginning to cause trouble.

The first steel mill seriously affected by shortage of coal was the Central Iron & Steel Co. at Harrisburg, which has withdrawn from the market. This plant will utilize fuel oil but will confine its work solely to orders on hand for the present. The Bethlehem Steel Co. has been obliged to withdraw two blast furnaces from operation at Bethlehem, while the Replogle Steel Co., which has been drawing partially upon Bethlehem for coke, is so short of fuel that it has temporarily stopped selling pig iron from its one active furnace at Wharton, N. J.

In some lines business has come almost to a standstill. This is not true so much in finished steel as in pig iron, ferroalloys and scrap. Meanwhile prices remain firm, and the tendency in finished steel is toward greater strength.

**Pig Iron.**—The effect of the coal and railroad strikes on blast furnace operation is being more seriously felt than at any time since the strikes began. The Bethlehem Steel Co. has been obliged to discontinue two furnaces at Bethlehem, while the Replogle Steel Co., which is partially dependent on Bethlehem for coke, is so short of fuel that it has withdrawn from the market. Other Eastern furnaces, if they are selling at all, are doing so with great caution. Only a few thousand tons of foundry iron has been sold within the past week, mostly by one furnace, and in other grades there is little or no activity. There is little demand from users of foundry iron, who complain that the present high prices do not permit them to compete successfully for castings, on which market prices are relatively lower than for pig iron. The consequence is that the foundries are going along with the iron they have on hand or under contract and are trusting that increased production of coal and coke will bring pig iron prices down when the coal strike is settled. Prices asked for foundry iron vary from \$25 to \$27, furnace, for No. 2 plain and from \$26 to \$28, furnace, for No. 2 X.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to \$1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$27.14 to \$27.76
East. Pa. No. 2X, 2.25 to 2.75	27.64 to 28.76
East. Pa. No. 1X	29.14 to 29.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to 30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to 31.17
Basic delivery eastern Pa.	25.75 to 26.75
Gray forge	25.50 to 26.00
Malleable	27.50 to 28.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	30.00

**Ferroalloys.**—There is a demand for carload lots of ferromanganese for prompt shipments, but sellers have little, if any, available for delivery before August or September. Spot ferromanganese is quoted at \$70,

while for forward delivery the price named for both British and domestic alloy is \$67.50, seaboard. Spiegeleisen is quoted at \$35 for 16 to 19 per cent, and at \$36 for 19 to 21 per cent.

**Semi-Finished Steel.**—Open hearth rerolling billets are quoted at \$35 and forging billets at \$40, Pittsburgh, with little demand.

**Plates.**—The Central Iron & Steel Co. is the first Eastern plate manufacturer whose plant has been affected by coal shortage. This plant will use fuel oil. It has withdrawn from the market. Another Eastern steel company is close to the end of its coal reserves and is virtually out of the market on all of its products. Prices are firm and the market this week is nearer 1.80c., Pittsburgh, than 1.70c. There is a fairly good demand for plates and premium prices are being paid in some instances, particularly for prompt delivery to the Pittsburgh district, sales having been made at 2c. and 2.05c., Coatesville mills. A sale is noted of 300 tons of 3/16 in. plates at 2c., base, Pittsburgh. The Baldwin Locomotive Works is in the market for considerable steel, it having taken orders for 75 new locomotives, 50 from the Baltimore & Ohio and 25 from the Reading, and more than 200 for repairs, including 100 from the Erie, 50 from the New York Central, 30 from the New York, New Haven & Hartford and 40 from the Baltimore & Ohio. Three or four inquiries that are pending total about 100 locomotives. The Newport News Shipbuilding & Dry Dock Co. will require about 4500 tons of steel, mostly plates, for two steamers it has contracted to build for the Ocean Steamship Co. The War Department is to build four dredges, requiring 1000 tons of plates each, and a Delaware River shipbuilding company has asked for prices on the steel. The Pennsylvania Railroad has bought more car repair material, its purchases within the past two weeks totalling 8000 to 10,000 tons. Eastern plate mills have decided to restore the cutting extras which were dropped a few months ago. We quote sheared plates, 1/4 in. and heavier, at 1.70c. to 1.80c., Pittsburgh.

**Structural Material.**—A publishing building for the United Lutheran Church at Thirteenth and Spruce Streets and a similar structure for the Reformed Church at Fifteenth and Race streets, each requiring about 1000 tons of steel, are up for bids. The Bethlehem Steel Co. has been awarded 300 tons of H sections for an office building for the Westinghouse Electric & Mfg. Co., Philadelphia. Plain material is in fair demand and the market is firm at 1.70c., Pittsburgh, while some makers are quoting 1.75c. and 1.80c.

**Warehouse Business.**—The present situation has caused more consumers to look to the warehouses for material and sales out of stock have picked up materially within the past week. Prices are unchanged and for local delivery are quoted as follows:

Soft steel bars and small shapes, 2.55c.; iron bars (except bands), 2.55c.; round edge iron, 2.75c.; round edge steel, iron finish, 1 1/2 x 1/2 in., 2.75c.; round edge steel planished, 3.50c.; tank steel plates, 1/4-in. and heavier, 2.65c.; tank steel plates, 3/16-in., 2.85c.; blue annealed steel sheets, No. 10 gage, 3.40c.; black sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.65c.; diamond pattern plates, 1/4-in., 4.35c.; 3/16-in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3.20c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and lighter, 3.45c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.20c.; iron bands, 3.90c.; rails, 2.36c.; tool steel, 8c.; Norway iron, 5.50c.; toe calk steel, 4.50c.; tire steel, 2.65c.; planished tire steel, 3.40c.

**Bars.**—The largest inquiry for steel bars is for 3500 tons of reinforcing quality for a water filtration plant at Buffalo. The Thompson-Starrett Co., New York, has the general contract. In common with the slump in demand for all steel products, steel bars are not so active, but there is a fair demand and it is difficult to buy for early delivery below 1.80c., Pittsburgh. Bar iron is quoted at 1.60c., Pittsburgh, for carloads and at 1.80c. for less carloads.

**Sheets.**—Most of the users of sheets appear to be well covered on contract and there is very little demand

for spot material. Prices quoted for prompt delivery are \$4 or \$5 a ton above the third quarter contract prices.

**Coke.**—Furnace coke is almost unobtainable at any price, while carload lots of foundry coke have been sold at prices ranging from \$10.50 to \$11.50, Connellsville. By-product coke is quoted at \$12.50, Swedeland, Pa.

**Old Material.**—The scrap market is so quiet that the prices quoted this week are largely nominal. There are few transactions, but the general trend is toward weakness. We quote for delivery to consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$15.00 to \$15.50
Scrap rails .....	15.00 to 15.50
Steel rails, rerolling.....	17.00 to 17.50
No. 1 low phos., heavy 0.04 and under .....	22.00 to 24.00
Cast iron car wheels.....	17.50 to 18.50
No. 1 railroad wrought.....	17.00 to 17.50
No. 1 yard wrought.....	15.00 to 15.50
No. 1 forge fire.....	13.00 to 13.50
Bundled sheets (for steel works).....	13.00 to 13.50
No. 1 busheling.....	12.50 to 13.00
No. 2 busheling.....	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use).....	13.00 to 13.50
Mixed borings and turnings (for blast furnace use).....	13.00 to 13.50
Machine-shop turnings (for steel works use).....	13.00 to 13.50
Machine-shop turnings (for rolling mill use).....	13.50 to 14.00
Heavy axle turnings (or equivalent).....	14.00 to 14.50
Cast borings (for steel works and rolling mills).....	14.00 to 14.50
Cast borings (for chemical plants).....	16.50 to 17.50
No. 1 cast.....	17.50 to 19.50
Railroad grate bars.....	14.50 to 15.00
Stove plate (for steel plant use).....	15.00 to 15.50
Railroad malleable .....	15.00 to 15.50
Wrought iron and soft steel pipes and tubes (new specifications).....	13.00 to 13.25
Shafting .....	20.00 to 20.50

## Boston

BOSTON, July 18.

**Pig Iron.**—Sales in this territory the past week approximate 3,000 tons, including 450 tons of foreign iron. The General Electric Co.'s purchase of 750 tons of Buffalo iron on a \$24.50 furnace base constitutes the largest individual transaction. Of this amount 500 tons is silicon 3.25, minimum, for the Lynn, Mass., plant, and 250 tons of silicon 3.26 to 3.75 for Pittsfield, Mass., July and August delivery. Additional small tonnages of other Buffalo iron were taken by melters at \$25 base furnace. Other sales include 500 to 600 tons eastern Pennsylvania No. 2X and No. 1X, in small lots, at \$26.50 and \$27 furnace for the former, and \$27.50 and \$28 for No. 1X, third quarter delivery; 150 tons special analysis Virginia for mixture purposes at private terms, and a car of lake charcoal at \$28.50 base furnace. A western Pennsylvania furnace, competing with Buffalo interests in this territory, has advanced its price \$1 to \$26 for No. 2X and \$27 for No. 1X furnace. Foreign iron sold was 400 tons French silicon 2.50 to 3.00, July shipment, to a Massachusetts stove maker, on a delivered basis \$3 to \$4 under domestic quotations, and 50 tons Scotch of No. 2X, August shipment, to a Massachusetts jobbing foundry, on a delivered base about \$1 under domestic. Several tentative inquiries are out on domestic iron for fourth quarter delivery, but the only new inquiry for nearby delivery is 100 tons of low phosphorus for the Boston Navy Yard.

We quote delivered at common New England points as follows, having added to furnace prices \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

East. Penn., sil 2.25 to 2.75.....	\$30.15 to \$30.65
East. Penn., sil 1.75 to 2.25.....	29.65 to 30.15
Buffalo, sil 2.25 to 2.75.....	29.91 to 30.41
Buffalo, sil 1.75 to 2.25.....	29.41 to 29.91
Alabama, sil 2.25 to 2.75.....	28.60 to 30.10
Alabama, sil 1.75 to 2.25.....	28.10 to 29.60

**Ferroalloys.**—Although not active, the demand for ferromanganese in this territory shows more life. Wire making interests are the largest buyers, others taking small tonnages, on a basis of \$67.50 c.i.f. Boston.

**Finished Material.**—The Phoenix Bridge Co. is awarded 1300 tons of structural steel for a Tomlinson, Conn., bridge, and the Bethlehem Steel Co. 172

tons of beams for the East Boston street railway loop. Bids will be opened to-day on approximately 900 tons of structural steel for the State pier, Portland, Me. Bids on several round tonnages of structural steel have been rejected within the past 10 days, and will be asked to be refigured. One Pennsylvania mill, which recently re-entered the structural steel market, has secured a comfortable backlog and has raised its price to 1.70c. Pittsburgh base, which is more in line with the other mills. A Buffalo mill is making more prompt deliveries on all products, having secured additional labor, but Pennsylvania mill deliveries have not improved. All mills report little new business booked so far this month, and prices unchanged.

**Warehouse Business.**—The movement of iron and steel out of New England warehouses shows no expansion, barely holding its own. Contrasted with a year ago, however, business, according to some interests, is 60 to 75 per cent better. Warehouse stocks are in good condition and presumably enough to carry the trade along two months, with an occasional fill-in lot from mills. Prices are firm and unchanged.

Jobbers quote: Soft steel bars, \$2.60½ per 100 lb. base; flats, \$3.25½; concrete bars, \$2.75 to \$2.88; structural steel, \$2.60½ to \$2.70½; tire steel, \$4 to \$4.35; open-hearth spring steel, \$4.50 to \$6; crucible spring steel, \$11.50; steel bands, \$3.75; hoop steel, \$4.25; cold rolled steel, \$3.50 to \$4; refined iron, \$2.60½; best refined iron, \$4.25; Wayne iron, \$5.50; Norway iron, \$6 to \$6.50; plates, \$2.70½ to \$2.87½; No. 10 blue annealed sheets, \$3.75 per 100 lb. base; No. 28 black sheets, \$4.90; No. 28 galvanized sheets, \$5.90.

**Coke.**—New England by-product coke producers have advanced crushed coke 50c. a ton to \$12 ovens for spot, \$11 for contract, and \$12.50 for tonnages to be delivered outside New England. On foundry coke the market is strong and unchanged at \$14.50 delivered where the local freight does not extend \$3.10 on spot. The contract price is nominal at \$13.50 delivered, both producers still remaining out of the market. Developments in the railroad strike situation have caused foundries to take their full monthly contract allotments, which makes for greater activity at ovens. Spot Connellsville coke sold the past week to New Hampshire foundry interests at \$10.25 ovens or \$15.59 delivered, \$1.09 above the delivered price of by-product coke made in this territory.

**Old Material.**—Important old material interests are fairly busy making shipments to Pennsylvania on contracts placed heretofore, but report almost no new business the past week. On new contracts, interest centers almost exclusively in borings and turnings. Several hundred tons of cast iron borings, suitable for chemical purposes, have been purchased at around \$11 on cars shipping point, and a few mixed turnings at \$9.50. It is intimated purchases will be made this week of heavy melting steel for Pennsylvania mill consumption. Additional deliveries of stove plate at \$15.50 Norwood, Mass., are noted, but this material appears in short supply at that price. Boston brokers say they cannot interest New England foundries in machinery cast. These melters are still able to supply requirements from local yards, or from out-of-town yards, who make delivery by truck, which works out to better advantage to the melter than railroad transportation.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$19.00 to \$20.00
No. 2 machinery cast.....	17.00 to 18.00
Stove plate .....	14.00 to 14.50
Railroad malleable .....	15.00 to 15.50
Street car wheels.....	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$11.00 to \$11.50
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 yard wrought.....	10.00 to 10.50
Wrought pipe (1 in. in diam. over 2 ft. long).....	8.00 to 8.50
Machine shop turnings.....	8.50 to 9.00
Cast iron borings, rolling mill.....	9.50 to 10.00
Cast iron borings, chemical.....	10.50 to 12.00
Blast furnace borings and turnings.....	8.50 to 9.40
Forged scrap and bundled skeleton.....	8.00 to 8.50
Street car axles and shafting.....	14.50 to 15.00
Rerolling rails .....	11.00 to 11.50

Recent fire at the plant of the Atlantic Refining Co., Franklin, Pa., resulted in the loss of only one tank out of several hundred in the plant. The company is not in need of new material or equipment.

## San Francisco

### Active Competition in Water Freights Has Marked Effect on Market

SAN FRANCISCO, July 12.

**Pig Iron.**—A moderately good business has prevailed on the Coast, but individual buyers are not disposed to take more material than satisfies their daily needs, so that sales have been almost exclusively in small lots. It is estimated by the principal handlers of foreign iron that around 1000 tons of English material has been sold for San Francisco and Los Angeles delivery during the past fortnight. The market appears easier at present with offerings of No. 1 quality at close to \$29, ex-ship, Pacific Coast ports. A feature of the recent trading was the sale of 250 tons of Chinese iron, made under an old contract, at \$31, ex ship. Due to high quotations from the Orient, there have been no sales of Chinese material in this market for a number of months. Domestic pig iron continues inactive, as no attractive rates have been offered of late. Moreover, the highly competitive rates being quoted by inter-coastal steamship operators are tending to restrict business.

**Cast Iron Pipe.**—The greatest activity at present seems to be in soil pipe, which reflects a consistent demand. Many of the large makers are reported sold up for at least 60 days, with the result that a good deal of new business is being rejected. Prices, however, are unchanged. The trade is watching with interest the existing rate war being waged between intercoastal lines, and while the new reductions in freights do not affect shipments from the South, there is some speculation as to whether the attractive figures in the North will encourage business between Atlantic Coast water pipe foundries and the Pacific Coast, an unusual situation. There is no apparent change in the market of heavy pipe, the delivered price approximating \$50 for 6-in. and \$54 for 4-in. Both municipal and private business is quiet.

**Finished Iron and Steel.**—The active competition in water freights is having a marked effect on business in finished materials, and few makers report any new contracts of considerable size. Consumers, in other words, are showing a tendency to purchase cautiously and for their immediate requirements only. Some confusion is apparent, due to mills quoting on different bases, some being delivered, some tidewater and others f.o.b. Pittsburgh. The result is that it is difficult to ascertain a real market on heavy materials. A few mills are quoting as much as \$7 a ton higher than the Steel Corporation prices, but are offering quick delivery. This situation, however, is considered as temporary only, and it may be said that the steel business on the Coast is active and fundamentally sound. More than one large maker reports June as the best month in a year and a half. There are a few large prospects in the market at present, one for 5200 tons and another involving 1200 tons of heavy products. A carlot business is being done in sheets and plates. There is nothing new in the bar situation. Bolts and nuts are quiet so far this quarter after the heavy buying last. The Penn Bridge Co. was low bidder on the Snake River bridge at Central Ferry, Wash., which involved about 1000 tons. Oakland has taken 450 tons of girder rails.

**Coke.**—The Interstate Commerce Commission ruling of July 1 providing for a 10 per cent cut on all freight, both local and transcontinental, on all commodities not reduced since August, 1918, has not affected business in coke, as it probably has on pig iron, because buyers on the Coast seem willing to pay a premium for quick delivery, in any case. A few spot sales of domestic coke are reported, but generally in small quantities. Prices on Birmingham material rule from \$7 to \$8, f.o.b. ovens, and those on West Virginia beehive are quoted from \$8.50 to \$9.50. Around 1500 tons of coke from Great Britain, some of which is now in transit, is reported sold for foundry accounts. Dealers and importers are figuring on 1000 tons for a Northern consumer.

**Old Material.**—There appears to be a firmer tendency in scrap, due apparently to the stiffening in the finished market and to delayed Eastern shipments. A few good-sized sales have been consummated of late, conspicuous among which is that of 5000 tons, offered by the Market Street Railway, at about \$11 a gross ton, delivered at buyer's works. The Southern Pacific Co. is offering 1000 tons of wrought iron scrap, 200 net tons of scrap steel axles and 350 of miscellaneous cast iron scrap. The Pacific Gas & Electric is disposing of a quantity of old material to a local dealer. A scarcity of cast iron scrap in this market is reported, and prices appear firm at \$22 a net ton, delivered at consumers' works.

## Cincinnati

CINCINNATI, July 18.

**Pig Iron.**—Dullness continues in the Cincinnati iron market, and only a few sales are reported. Southern iron is still available on a basis of \$18, Birmingham. The largest sale reported was of 700 tons to a Kentucky implement manufacturer for fourth quarter shipment. It is understood that this order was placed on an \$18.50, Birmingham, basis. A sale of 400 tons of Buffalo iron, on a \$24, furnace, basis was made in the Wheeling district, and another West Virginia melter took 300 tons of southern Ohio iron on a \$24, Ironton, basis. A central Ohio implement manufacturer bought 200 tons of iron, the first in over eighteen months, which is taken as an indication of returning activity in this industry. Inquiry is confined to carload lots for immediate shipment. The railroad strike is becoming serious in this district. Railroads have placed embargoes on coke shipments from West Virginia points, and inability to move coal is seriously threatening the operation of coke oven plants. The coke supply is so short that a number of furnaces now operating in this district may be forced to bank before the week ends. Shipping instructions are coming forward for third quarter allotments and furnaces are being asked to anticipate shipments wherever possible, but movement of iron is very slow.

Based on freight rates of \$3.53 from Birmingham and \$2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base).....	\$21.53
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)....	22.03
Ohio silvery, 8 per cent.....	34.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)....	26.27
Basic Northern .....	27.27
Malleable .....	26.27

**Warehouse Business.**—Local warehouses report a very active demand for their products, as shipments from mills are getting further behind and those now on the way are being held up on account of the railroad strike. The demand for shapes and plates continues to improve steadily and reinforcing bars are also moving in heavier volume. Jobbers of wire products report business as rather light. Prices show little change with the exception that bolts and nuts and screws have been advanced approximately ten per cent.

Jobbers quote: Iron and steel bars, 2.75c. base; hoops, 3.60c.; bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold-rolled rounds, 3.35c. base; flats, squares and hexagons, 3.85c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, \$2.70 per 100 lb.; common wire nails, \$2.85 per keg, base.

**Finished Material.**—The market, generally speaking, is rather quiet, although the demand for sheets continues in good volume. Specifications are coming in, however, on existing contracts and while shipments are beginning to slow up as a result of the railroad strike, the situation locally has not yet become acute. Practically all of the new business booked is for small tonnages, although occasionally an order running into three figures is accepted. The Big Four Railroad last week took bids on its third quarter requirements of plates, shapes, bars, billets car axles and bar iron. On 1400 tons of car plates the Carnegie Steel Co. was low bidder at 1.60c. Pittsburgh. The Steel Corporation was also low bidder on 75 tons of bars and 500 tons of shapes, the same price being quoted. On 160 tons of billets the Wheeling Steel Corporation was low bidder

at \$39 per ton, f.o.b. Pittsburgh, and on 1100 tons of bar iron a western Indiana rolling mill was low bidder at approximately 1.75c. mill. On 700,000 bolts, a Youngstown manufacturer was low bidder; and on 500 tons of car axles, the Cambria Steel Co. was low bidder at 2.395c. On sheets the prices named by the American Sheet & Tin Plate Co. are being more generally adhered to by independent mills, although in some instances higher prices are asked for automobile body sheets. The nail and wire market shows only fair activity, although prices are strong. In the structural field, a number of small projects came up during the week and several awards were reported. On reinforcing bars, the demand continues strong, a number of awards having been made for buildings running as high as 150 and 200 tons.

**Coke.**—There is a fair demand for foundry coke for prompt shipment, and prices have shot up rapidly during the week. Wise County foundry coke has sold as high as \$10.50, ovens, and New River at \$10. By-product fuel is generally quoted at \$10, ovens, and in some instances even higher prices have been paid. Furnace coke is in extremely short supply, and we note an inquiry from a Cleveland district stack for 36,000 tons. Movement of coke is slow on account of the railroad strike.

**Old Material.**—There is practically no activity in the local scrap market. Foundries are pretty well supplied, and steel plants in the district are well covered by contracts. Prices are firm, but quotably unchanged.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	\$8.00 to \$8.50
Iron rails	13.50 to 14.00
Relaying rails, 50 lb. and up	26.50 to 27.00
Re-rolling steel rails	13.50 to 14.00
Heavy melting steel	13.00 to 13.50
Steel rails for melting	13.00 to 13.50
Car wheels	14.50 to 15.00
Per Net Ton	
No. 1 railroad wrought	11.50 to 12.00
Cast borings	9.00 to 9.50
Steel turnings	8.00 to 8.50
Railroad cast	14.00 to 14.50
No. 1 machinery	16.00 to 16.50
Burnt scrap	9.50 to 10.00
Iron axles	18.00 to 18.50
Locomotive tires (smooth inside)	11.00 to 11.50
Pipes and flues	6.50 to 7.00

## Buffalo

BUFFALO, July 17.

**Pig Iron.**—One furnace which quoted \$24 a week ago has now advanced to \$24.50 base, and has even sold No. 2 plain at \$25 base. A curtailment in pig iron production in this district may be a development of the next few weeks, on account of the fuel situation. Good grades of coke are quoted at \$14 delivered when it can be obtained. Sales for the week are less than 10,000 tons. The fuel situation with all factors is extremely serious, and all stocks are near exhaustion. Malleable is quoted at \$24. One furnace having inquiries for 1000 tons, 600 tons and several for 500 tons is reluctant to quote, not knowing whether it will be able to deliver.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	\$25.00
No. 2X foundry, 2.25 to 2.75 sil.	24.50
No. 2 plain, 1.75 to 2.25 sil.	24.00
Basic	24.00
Malleable	24.00
Lake Superior charcoal	31.75

**Finished Iron and Steel.**—Bar inquiry has fallen off in several offices. The Steel Corporation and a leading independent are still quoting 1.70c. minimum on bars, and a minimum of 1.80c. is being quoted by a local independent on such business as can be taken for immediate rolling. Nothing is booked for extended delivery by this interest. The same mill is running all departments at full capacity, with the exception of the plate mill, and in that department there is no likelihood that it will be started while prices are as they are and the fuel situation so precarious. A Rochester car shop is in the market for 200 tons of shapes. The Buffalo Steel Car Co. is understood to have bought part of its 8000-ton plate requirement to be used on car repairs

at less than 1.75c., and that considerable difficulty was encountered in placing this business. Sheets are quiet. Local sellers quote 3.15c. to 3.30c. on black and 4.13c. to 4.30c. on galvanized. The Steel Corporation is understood to be quoting 4.15c. and other independents 4.30c. on galvanized. Interest in shipments is keen, and pressure for delivery strong, indicating that consumers are using material as fast as it can be delivered. No structural jobs of consequence have appeared. A number of awards ranging from 10 to 25 tons have been booked by a leading fabricator.

We quote warehouse prices, f.o.b. Buffalo, as follows: Structural shapes, 2.65c.; plates, 2.65c.; soft steel bars, 2.55c.; hoops, 3.30c.; bands, 3.15c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.40c.; black sheets, No. 28, 4.40c.; cold-rolled strip steel, 6.05c.; cold-rolled round shafting, 3.35c.

**Old Material.**—The majority of mills are interested in steel purchases, and the market is strong at \$17. There is little available, however, and all dealers' stocks are low. Cast iron borings are scarce, and consumers are offering \$14.50 to \$15, but there is no rush to fill the orders.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	\$16.75 to \$17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	17.00 to 18.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	14.00 to 14.50
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 bushing	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.00 to 18.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	17.00 to 17.50

## St. Louis

ST. LOUIS, July 18.

**Pig Iron.**—The market for pig iron remains firm at unchanged prices, although no sales of consequence were made during the week. Scattering sales of Northern iron up to 100 tons were the rule. The Sheffield maker continues to quote \$18.50, Birmingham, while others are offering their product at \$19 to \$20. Sales of the lowest price iron were about 1200 tons during the week, which nearly all of the Southern make sold. There is a very heavy inquiry for foundry iron of the high-silicon grades, which consumers are not finding particularly easy to purchase. These high-silicon grades are not available from the East Side maker. An Iowa user is in the market for 10,000 tons of standard basic for prompt shipment. An inquiry also has been received from a Birmingham melter for 1000 tons of foundry iron with liberal manganese. It is feared that the melt of iron in the district may be seriously affected because of the shortage of coal. The market for the ferroalloys is quiet, users in the district being well covered with their requirements for some time.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago and \$4.22 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	
(third quar.)	\$26.66
Northern malleable, sil. 1.75 to 2.25	
(third quar.)	26.56
Basic (third quar.)	26.56
Southern foundry, all rail, sil. 1.75 to 2.25	\$22.72 to 24.22
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis	22.17

**Finished Iron and Steel.**—Despite the strike, inquiries were issued during the week by railroads centering in the St. Louis district for material for repair work, although small material was mostly wanted. The Missouri-Kansas-Texas has an inquiry out for its requirements of locomotive jacket steel for the last half of the year. It is understood that this road used about three carloads during the first half of the year. The same railroad wants 2500 kegs of standard track spikes. Bids will close on July 25 for Akdar Temple, Tulsa, Okla., involving 219 tons of steel. C. W. & George L.

Robb, Chicago, are the architects. Little interest is being taken in inquiries received by representatives here of steel interests, because their plants not only are well sold up but production is being curtailed because of the coal strike.

For stock out of warehouse we quote: Soft steel bars, 2.57½ c. per lb.; iron bars, 2.57½ c.; structural shapes, 2.67½ c.; tank plates, 2.67½ c.; No. 10 blue annealed sheets, 3.72½ c.; No. 28 black sheets, cold rolled, one pass, 4.45 c.; cold drawn rounds, shafting and screw stock, 3.50 c.; structural rivets, \$3.19½ per 100 lb.; boiler rivets, \$3.29½; tank rivets, 7/16 in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, \$3.50; and tapped, \$3.25 off list.

**Coke.**—Coke continues in big demand both from the industries and from the coal trade. The St. Louis producer of by-product coke is sold up through July and is not taking on any new business. Granite City by-product coke is still to be had. Connellsville coke is very difficult to get, the market price being \$10.50 at the ovens. The shortage of coal is creating a greater demand for coke as well as tending to curtail its production.

**Old Material.**—The market for old material continues very strong. Very little railroad scrap is moving because of the strike. Several large buyers are in the market for heavy melting steel and special steel grades. Large tonnages of rolling mill grades are being moved out of the St. Louis district. The general feeling is that after the coal strike is settled, buying will be on a much larger scale.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton		
Old iron rails.....	\$16.75 to	\$17.25
Steel rails, rerolling.....	15.25 to	15.75
Steel rails, less than 3 ft.....	16.25 to	16.75
Relaying rails, standard section.....	25.00 to	28.00
Cast iron car wheels.....	18.25 to	18.75
No. 1 heavy railroad melting steel.....	14.75 to	15.25
No. 1 heavy shoveling steel.....	13.50 to	14.00
Ordinary shoveling steel.....	13.50 to	14.00
Frogs, switches and guards, cut apart.....	15.00 to	15.50
Per Net Ton		
Heavy axle and tire turnings.....	9.50 to	10.00
Steel angle bars.....	13.75 to	14.25
Iron car axles.....	23.00 to	23.50
Steel car axles.....	17.00 to	17.50
Wrought iron bars and transoms.....	18.50 to	19.00
No. 1 railroad wrought.....	12.75 to	13.00
No. 2 railroad wrought.....	12.25 to	12.75
Railroad springs.....	16.00 to	16.50
Steel couplers and knuckles.....	16.00 to	16.50
Cast iron borings.....	9.00 to	9.50
No. 1 bushelling.....	11.25 to	11.75
No. 1 railroad cast.....	15.50 to	16.00
Stove plate and light cast.....	12.75 to	13.25
Railroad malleable.....	13.50 to	14.00
Pipes and flues.....	8.25 to	8.75
Machine shop turnings.....	8.50 to	9.00

## Birmingham

BIRMINGHAM, ALA., July 18.

**Pig Iron.**—It is positively asserted by those in a position to know that all offerings of iron at \$18 had ceased at the end of last week and that makers heretofore quoting \$18.50 freely were more inclined to ask \$19. The week was duldest in many, with makers holding for \$20. Inquiry was sparse. The few sales made at \$20 were for small lots and nearby delivery. The feature of the close of the week was the statement of the Sloss-Sheffield Steel & Iron Co. that this concern had booked 26,000 tons of iron up to July 15 on a probable month's make of 35,000 tons. This company booked more than 50,000 tons in June. Even under a five-stack operation, that is regarded as heavy tonnage, preceded as it was by large bookings and facing little or no iron on company yards either on part of this or any other iron maker. The Tennessee company went to nine-furnace operation this week, blowing in a third Bessemer stack on foundry and changing one from foundry to ferromanganese. The Tennessee company's iron operations, like steel, are the heaviest of several years. Delay in publishing the extra low rates to Cincinnati, St. Louis and Louisville announced by the Louisville & Nashville and Southern railroads as well as the two strikes and delays in transit that are apprehended combined in producing a very dull weekend. Production, however, has not set-back and, as a whole,

is greatest in steel on record and up to normal in iron.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$18.50 to \$20.00
Basic.....	18.50 to 19.00
Charcoal, warm blast.....	30.00 to 32.00

**Cast Iron Pipe.**—The pressure pipe base is \$37, but \$38 was gotten by some concerns on recent orders. Plants are principally concerned with deliveries. A cargo of 3,000 tons, pressure and sanitary, left Mobile for the Pacific Coast, delivery from San Francisco to Seattle. The sanitary pipe base is \$55, but belated consumers continue offering \$60 and \$65 for prompt delivery and not all are accommodated.

**Finishing Mills.**—The Tennessee company continued double turn in finishing mills this week as well as maximum production of ingots. The American Steel & Wire Co. is executing a large wire order for Japan and the Gulf States Steel Co.'s export business includes an order from Palestine. Hoops and bands are moving to Argentine. All steel mills are on near full or full turn.

**Coal and Coke.**—Railroads are wary of sending cars into the coal fields except for their own use, hence there is some distress. Commercial coal business in the West offers but cannot be served. Spot price is rather stiff at \$2.50. Maximum production seems to have been reached. Peru has taken another 4,000 tons of gas coal and Cuba took 3,000 tons. The rail strike has not handicapped coal production or coke movements locally. Coke sells at \$5.50 to \$6.

**Old Material.**—The scrap market is rather quiet with deliveries on contracts still going on in a large way. There has been no change in prices. Lower freight rates have not apparently widened territory.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails.....	\$13.00 to \$15.00
No. 1 steel.....	12.00 to 14.00
No. 1 cast.....	15.00 to 16.00
Car wheels.....	14.00 to 15.00
Tramcar wheels.....	13.00 to 14.00
Stove plate.....	13.00 to 14.00
Cast iron borings.....	6.00 to 7.00
Machine shop turnings.....	4.00 to 5.00

## New York

### Seriousness of Coal Strike Shown in Withdrawal of Iron and Steel Producers from Market

NEW YORK, July 18.—The seriousness of the coal situation is shown in the actual withdrawal from the market temporarily of several important producers of pig iron and steel in the East, while a number of other plants are having difficulty in obtaining coal and coke, and may be compelled at any time to cease operations. Some important sellers of pig iron have virtually withdrawn from the market by naming high prices. News from the coal mines is extremely discouraging. A New York seller who visited West Virginia and Pennsylvania a few days ago says conditions at the mines are even worse than has been reported.

**Pig Iron.**—The General Electric Co. continues to be the principal buyer of pig iron. In addition to purchases recently made amounting to about 2500 tons for its Lynn and Pittsfield, Mass., and Elizabethport, N. J., plants, it is now in the market for an additional tonnage for New York State plants. It is understood that most of the iron purchased for this company will come from Buffalo, having been bought on a basis of \$24 for No. 2 plain. Buying by other companies is limited. One company, which has been selling No. 2 plain at \$25.50 and No. 2 X at \$26.50, is now out of the market. Small tonnages of foreign iron are being received, but dealers are showing a disposition to be cautious in buying large tonnages. Although such purchases might relieve the scarcity in this country due to the coal strike, many uncertainties are connected with foreign transactions.

We quote delivered in the New York district as follows, having added to furnace prices \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25.....	\$29.77 to \$30.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75.....	28.77 to 29.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25.....	27.77 to 28.77
Buffalo, sil. 1.75 to 2.25.....	28.91 to 29.41
No. 2 Virginia, sil. 1.75 to 2.25.....	29.44 to 30.44

**Ferroalloys.**—The market is inactive. A little ferromanganese is available for prompt shipment and sales are being made at \$70, seaboard. For forward delivery, August or September, the quotation is \$67.50, seaboard, for both British and domestic. Spiegeleisen is still quoted at \$35 for 16 to 19 per cent, and at \$36 for 19 to 21 per cent. Prices on other alloys are found in the table below:

Ferromanganese, domestic, seaboard, per ton.	\$67.50
Ferromanganese, British, seaboard, per ton.	\$67.50
Spiegeleisen, 17 to 19 per cent.	\$35.00
Spiegeleisen, 20 per cent.	\$36.00
Ferrosilicon, 50 per cent, delivered, per ton.	\$55.00 to \$62.00
Ferrotungsten, per lb. of contained metal, 40c. to 50c.	
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered.	12c. to 14c.
Ferrovandium, per lb. of contained vanadium.	\$3.00 to \$3.50
Ferrocobaltititanium, 15 to 18 per cent, 1 ton to carloads, per ton.	\$200.00

#### Ores

Manganese ore, foreign, per unit, seaboard.	25c. to 26c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal.	\$3.00 up
Chrome ore, basis 48 per cent Cr <sub>2</sub> O <sub>3</sub> , crude, per unit, Atlantic seaboard.	40c. to 45c.
Molybdenum ore, 85 per cent concentrates, per lb. of MoS <sub>2</sub> , New York.	40c. to 45c.

**Finished Iron and Steel.**—The national rail and coal strikes are regarded as responsible for a decided slump in inquiry. It remains, however, that demand is still sufficient in volume to cause mills to scrutinize carefully in the light of their own mill conditions before making any quotations. New railroad equipment buying has halted and little is expected in the next sixty days, seeing that fresh orders would not always mean deliveries of cars in time to be of service for the transportation pressure likely when free movements are again established. For the time being railroad buying is expected to lie largely in repair items. Bar mills are busy and no let up is discernible in the automobile trade. The structural trade is fairly active.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.04c. to 2.14c.; structural shapes, 2.04c.; bar iron, 1.94c.; and steel plates, 1.99c. to 2.04c. On export shipments the freight rate from Pittsburgh to New York is 28.5c. per 100 lb., while the domestic rate is 34c.

**Cast-Iron Pipe.**—Business continues intensely active with most Northern pipe foundries probably from three to four months and more behind on deliveries. While the situation resulting from the coal strike has not yet affected most of them seriously, it is reported that the foundries in the South have been having some difficulty in obtaining iron and are also getting behind on deliveries. No new municipal tenders are reported, but private buying continues strong. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$53.50; 4-in. and 5-in., \$58; 3-in., \$68.30, with \$4 additional for class A and gas pipe.

**Warehouse Business.**—Another upward revision of prices is expected in this district. Probably the change, if it is made, will amount to a 10c. per 100 lb. advance over present prices, in conformance with the correspondingly higher base of mill prices. The present warehouse quotations are established on a basis of 1.60c. per lb. base, Pittsburgh, for bars. In contrast with the strong condition of practically all other iron and steel items in this market, both black and galvanized sheets are weak, prices ranging downward from the official schedule of 4.35c. and 5.35c. per lb. on black and galvanized respectively, which most warehouses are attempting to maintain, to as low as 4c. and 5c. per lb. Dealers in wrought iron and steel pipe report no change. Brass and copper products have been advanced 1/2c. per lb. and although the usual late spring and early summer trade has been supplied, business continues active, particularly in both brass and copper materials entering into buildings. We quote prices on page 200.

**High Speed Steel.**—The market is unchanged. Some producers state that a slight improvement is evident. Prices continue at about 75c. per lb. for 18 per cent tungsten high speed steel, with special brands of some companies selling up to as high as 95c. per lb.

**Coke.**—Coke prices are advancing rapidly and the

lowest price for Connellsville grades which has been named is \$11.75, while \$12 and \$13 has been asked. By-product coke has been advanced 50c. to \$11 seaboard for regular customers. Furnace and foundry coke are being sold without much discrimination.

**Old Material.**—No change in the market is evident and although sales are largely confined to small tonnages, prices are stiff. Based upon quotations of No. 1 heavy melting steel to Monessen of \$16.50, to Bethlehem of \$14.50 and to Alan Wood of \$14, the market here is quotable at \$10 to \$10.50 per ton. With the possibility of selling scrap into a Buffalo market at \$17 per ton, dealers in this district are showing considerable interest in possible sales in that direction. Specification pipe is slightly stronger and now quoted at \$8.50 to \$9 per ton, while stove plate is off slightly, \$10 to \$10.50 being a fair estimate of the market.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.	\$10.00 to \$10.50
Steel rails, short lengths, or equivalent	11.00 to 11.50
Rerolling rails	11.00 to 11.50
Relaying rails, nominal.	27.00 to 28.00
Steel car axles.	16.00 to 17.00
Iron car axles.	22.00 to 23.00
No. 1 railroad wrought.	12.50 to 13.00
Wrought iron track.	11.00 to 11.50
Forge fire	8.00 to 8.50
No. 1 yard wrought, long.	10.50 to 11.00
Cast borings (clean).	9.00 to 10.00
Machine-shop turnings	9.00 to 10.00
Mixed borings and turnings.	9.00 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long).	8.50 to 9.00
Stove plate	10.00 to 10.50
Locomotive grate bars.	11.50 to 12.00
Malleable cast (railroad).	10.00 to 10.50
Cast-iron car wheels.	13.00 to 13.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast.	\$18.00 to \$19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size.	16.50 to 17.00
No. 1 heavy cast, not cupola size.	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

## Cleveland

### Plants Suspend on Account of Strike—Railroads Cannot Handle Coal

CLEVELAND, July 18.—The fuel situation due to the breaking down of the railroad transportation system has become much worse and there has already been some curtailment of the blast furnace and steel plant operations in the Cleveland and Valley districts. In this city the McKinney Steel Co. has banked one blast furnace and shut down three open-hearth furnaces and the Bourne-Fuller Co. has shut down two of five furnaces at its Upson steel plant, which will be compelled to shut down entirely unless the situation improves shortly. The Trumbull-Cliffs furnace in Warren was banked to-day and the Cherry Valley furnace at Leetonia will probably go out during the week. Several other furnaces in Cleveland and other Ohio points have only enough coal for their by-products plants to last them from one to three weeks. The coal strike is a factor to a very limited extent in the present critical situation. The miners in the non-union fields of Kentucky and West Virginia on which the steel plants and blast furnaces are depending almost wholly for fuel are anxious to work, but the railroads are unable to handle coal owing to their inability to keep their motive power in repair because of the shopmen's strike. Very little coal is reaching Ohio mills and coke plants. Virtually no coal is now being shipped over the Norfolk & Western Railroad, little over the Louisville & Nashville and a sharp curtailment over the Chesapeake & Ohio. The Baltimore & Ohio Railroad has placed an embargo on coal from Cincinnati and Columbus to northern Ohio points. The Big Four is still open. The curtailment of transportation facilities has affected the Lake Superior iron ore mining district. The car supply on the Mesabi range has been cut 25 per cent and some producers in order to keep up operations in their open pit mines have discontinued loading cars at stock piles at underground mines.

**Iron Ore.**—Ore shipments from the mines to the upper lake docks are slowing down because of the bad condition of the motive power of the railroads, due to the shopmen's strike, and a sharp curtailment in the movement is expected before the end of the week. Boats are now being delayed somewhat for cargoes. At present the situation is worse at Superior, Wis., than at other shipping ports. So far there has been little slowing down in ore shipments from Lake Erie to interior furnaces, only two ports, Fairport and Toledo, being much affected. Shippers are experiencing delays in moving ore over the Baltimore & Ohio Railroad from those ports. Although some furnaces have been banked and others may be compelled to shut down for lack of fuel, consumers are taking all the ore they can handle, desiring to get as much in their furnace yards as possible before the situation becomes worse. In case their ore requirements are curtailed by reason of banking the furnaces, they can shut off on shipments earlier in the fall. With virtually no coal moving up the lakes, vessels are going up light for ore, and the lack of sufficient ore cargoes will probably result in the tying up of a number of boats. Coal for fueling lake vessels is so scarce at lake ports that some boats are getting their fuel from the ports at the head of the lakes. A strike of the firemen on the lake boats is a possibility. Firemen are at present taking a vote on calling a strike Aug. 1. No ore sales are reported and no activity is expected in the market until the present situation clears up somewhat.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$5.95; Old range non-Bessemer, 51½ per cent iron, \$5.20; Mesabi Bessemer, 55 per cent iron, \$5.70; Mesabi non-Bessemer, 51½ per cent iron, \$5.05.

**Pig Iron.**—With the present critical fuel situation and uncertainty as to furnace operations, some pig iron producers have advanced prices 50c. to \$1 a ton and others have withdrawn from the market. On foundry iron, the \$23 price has apparently disappeared, as a Toledo furnace has marked its minimum price up to \$23.50. A Cleveland furnace which has been quoting the latter price, but which does not wish any additional orders at present, took a 200-ton lot at \$25. Another Cleveland producer continues to quote this grade at \$24 and a western Pennsylvania furnace has advanced its price to \$25. For local delivery, foundry iron is quoted at \$24 in Cleveland, Toledo and Detroit. The market generally is not active, although one interest sold 10,000 tons during the week in lots of 1000 tons and under in foundry and malleable grades. Another booked a foundry iron order for a round lot. The General Electric Co., which was reported to be in the market for 700 tons, sent out additional inquiries for various grades of foundry iron for its Erie plant, aggregating 2000 tons. Of this about 300 tons of high silicon iron has been placed with a Cleveland furnace at \$24 base, and it is probable that the remainder will be bought from an Erie furnace. Low phosphorus iron is fairly active. A Valley interest reports sales aggregating 4000 tons, including one round lot. An inquiry is pending from a West Virginia consumer for 500 tons of low phosphorus iron. There seems to be doubt whether additional basic iron can be had for \$24, the price at which sales were reported last week at Pittsburgh. A local producer and also a local middleman are still asking \$25 for basic iron.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a \$3.02 rate from Jackson and a \$6 rate from Birmingham:

Basic, Valley furnace.....	\$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25.....	\$23.50 to 24.00
Southern fdy., sil. 1.75 to 2.25.....	24.50
Ohio silvery, sil. 8 per cent.....	33.52
Standard low phos., Valley furnace.....	33.00

**Semi-finished Steel.**—We note the sale of two lots of re-rolling billets, aggregating 5000 tons by a local mill at \$35, Cleveland. Sheet bars and slabs are quoted at the same price, but no sales are reported.

**Finished Material.**—Some of the independent mills have withdrawn from the market because the fuel shortage may cause them to curtail operations or shut down. New demand is not so active as it has been, but mills are turning away considerable tonnage. Some of the independent mills are now about as far behind on deliveries as the leading producers. Mills are being

crowded as hard as ever for deliveries, which seem to be growing somewhat worse. While consumers are trying to accumulate material for stock, some are actually in need of steel for current operations, this being particularly true of steel bars, strip steel, hoops and bands. Forging bars are apparently harder to get than other material. Inquiries are heavier for steel bars than for other lines. Specifications from automobile companies continue heavy and reports indicate that the leading Detroit car builders will keep up their present rate of production during August. There is no change in the price situation. On steel bars, plates and structural material, 1.70c. is generally the minimum quotation for delivery at the mills' convenience. However, there seems to be more of a willingness on the part of some buyers to pay considerably higher prices to be assured early deliveries. Plates are selling up to 2c. for prompt shipment and that is the general market price for the lighter gages. We note the sale of 2000 tons of carbon and alloy steel forging bars to a local consumer and another inquiry for 600 tons is pending. In structural lines, a large amount of building work is still coming out. Preliminary plans are being prepared for the Huron-Lorain bridge, Cleveland, which will require approximately 16,000 tons of steel if steel construction is decided upon, or 4000 tons of reinforcing bars if the bridge is built of concrete.

Jobbers quote steel bars, 2.41c.; plates and structural shapes, 2.51c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 3.90c. to 4c.; No. 28 galvanized sheets, 4.90c. to 5c.; No. 10 blue annealed sheets, 3.25c. to 3.46c.; hoops and bands, 3.06c.; cold-rolled rounds, 3.20c.; flats, squares and hexagons, 3.70c.

**Reinforcing Bars.**—The demand is heavy and small sections are scarce. The market is firm at 1.70c. to 1.80c. The general contract for the Buffalo filtration plant requiring 3500 tons has been taken by the Thompson-Starret Co. and the West Seventy-third Street bridge, Cleveland, requiring 230 tons by the Central States Engineering & Construction Co. The Ohio Highway Commission has placed 285 tons with the Concrete Steel Co. for road work. Bids have been taken for 1200 tons for the Western Reserve University group of buildings and bids will be taken July 29 for a Federal-State bridge at Conneaut, requiring 540 tons.

**Sheets.**—There is still considerable demand from the automobile trade for body sheets, but with this exception the buying is rather limited. Specifications are heavy, but mills are able to make shipments as fast as needed. Some independent mills are still quoting the American Sheet & Tin Plate prices. A leading Valley district producer has reduced its price \$2 per ton to 3.30c. for black, 4.30c. for galvanized and 2.50c. for blue annealed sheets.

**Coke.**—Prices on Connellsville foundry coke have further advanced, carlot sales being made at \$10.75 and the supply is very limited. Little, if any, Wise County foundry coke is available for immediate shipment.

**Old Material.**—The scrap market is weak, particularly on steel making grades, evidently being affected by the situation growing out of the railroad shopmen's strike. Some Valley district consumers have held up shipments and no new buying by the mills is reported. Small lot sales of heavy melting steel have been made locally at \$14.75, or 50c. lower than the recent minimum price. Turnings and borings and compressed steel are still fairly firm. Small lot sales of the latter are reported at \$16 for Youngstown delivery.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$14.75 to 15.25
Steel rails, under 3 ft.....	15.50 to 15.75
Steel rails, re-rolling.....	15.75 to 16.25
Iron rails.....	14.00 to 15.00
Iron car axles.....	18.00 to 19.00
Low phosphorus melting.....	16.00 to 16.25
Cast borings.....	12.50 to 12.75
Machine shop turnings.....	11.50 to 12.00
Mixed borings and short turnings.....	12.50 to 12.75
Compressed steel.....	12.85 to 13.25
Railroad wrought.....	14.00 to 14.50
Railroad malleable.....	15.50 to 16.00
Light bundled sheet stampings.....	10.00 to 10.25
Steel axle turnings.....	13.00 to 13.50
No. 1 cast.....	17.00 to 17.50
No. 1 busheling.....	10.75 to 11.00
Drop forge flashings over 10 in.....	10.75 to 11.25
Drop forge flashings under 10 in.....	10.75 to 11.25
Railroad grate bars.....	13.75 to 14.25
Stove plate.....	13.75 to 14.25
Pipes and flues.....	10.00 to 11.00

## British Iron and Steel Market

**Cleveland Pig Iron Weakening—Germany Promising Better Wire Deliveries—Tin Plates Lower But Sheets Advanced**

(By Cable)

LONDON, ENGLAND, July 18.

Control of Cleveland pig iron prices has been removed and the tendency is downward. Assisted by further impending reductions in railroad rates, 89s. (\$19.85) f.o.b. is acceptable for No. 3 G.M.B. Holidays here and disorganized foreign exchanges are checking business.

Hematite is weak and down to 91s. (\$20.29) f.o.b. has been done for East Coast mixed numbers. There is some talk of reduced output.

Foreign ore is lifeless and Bilbao Rubio is nominally 25s. (\$5.58) ex-ship Tees.

Steel generally is quiet. Germany bought 5000 tons of East Coast shipplates. Belgian merchant bars are quoted up to £7 10s. (1.49c. per lb.) f.o.b.

South America is buying Continental galvanized barbed wire. No. 12 gage has sold at £7 12s. 6d., cost and freight, (3.51c. per lb.) Buenos Aires.

Continental billets have sold for £5 15s. (\$25.65) f.o.b.

Continental foundry pig iron is easier at 80s. (\$17.84) f.o.b. L L L

German merchant bars are quoted at £7 15s. (1.54c. per lb.) f.o.b., for October delivery. German works are now in a position to supply wire meshing in all sizes.

Tin plates are easier and business quieter. They have sold at 17s. 6d. base, f.o.b. Common wasters are 17s. base.

Galvanized sheet makers have advanced prices but demand has not been stimulated and it is anticipated that prices will again recede in the near future. Rangoon specification sheets sold at £21 f.o.b. There is more enquiry from Japan for black sheets.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.46 per £1, as follows:

Durham coke, delivered	£1 6½s. to £1 7s.	\$5.91 to \$6.02
Cleveland No. 1 foundry	4 15	21.18
Cleveland No. 3 foundry	4 10	20.07
Cleveland No. 4 foundry	4 7½	19.52
Cleveland No. 4 forge	4 5	18.96
Cleveland basic	4 10	20.07
East Coast mixed	4 14 & 4 11*	20.96 & 20.29*
Ferromanganese	15 0	66.90
Ferromanganese*	14 10 to 14 15	64.67 to 65.78
Rails, 60 lb. and up	7 17½ to 9 10	35.12 to 42.37
Billets	7 0 to 8 0	31.22 to 35.68
Sheet and tin plate bars, Welsh	7 7½	32.89
Tin plates, base box	0 19½ to 0 19¾	4.35 to 4.40
C. per Lb.		
Ship plates	9 0 to 10 0	1.79 to 1.99
Roller plates	13 0 to 14 0	2.59 to 2.79
Tees	9 5 to 10 10	1.84 to 2.09
Channels	8 10 to 9 15	1.69 to 1.94
Beams	8 5 to 10 0	1.64 to 1.99
Round bars, ¾ to 3 in.	9 5 to 10 10	1.84 to 2.09
Galvanized sheets, 24 g.	15 15 to 16 10	3.14 to 3.29
Black sheets	12 0	2.39
Steel hoops	12 0 & 12 5*	2.39 & 2.44*
Cold rolled steel strip, 20 g.	23 2½	4.60
Cotton ties, Indian specifications	15 0	2.99

\*Export price.

## British Iron and Steel Exports and Imports

WASHINGTON, July 18.—Iron and steel exports of the United Kingdom during June totaled 236,298 gross tons, a decrease of 36,139 tons under May, according to a cablegram received to-day by the Department of Commerce from Commercial Attache Walter S. Tower, London.

Imports in June aggregated 52,775 tons, a decrease of 8164 tons under May.

Production of pig iron of all grades in June totaled

369,200 tons, instead of the figure given on page 116 of the issue of July 13.

At the close of June there were 115 blast furnaces and 212 open-hearth furnaces in operation. This compares with 110 blast furnaces and 220 open-hearth furnaces in operation at the end of May.

## Fuel Oil Substituted for Coal at Valley Steel Plants

YOUNGSTOWN, July 18.—Steel plants are substituting fuel oil for coal wherever possible. Valley independents Tuesday received 43 cars of fuel oil in one trainload.

Owing to scarcity of offerings, there has virtually ceased to be a coal market. Independents are preparing under promise of Federal protection to operate Pennsylvania workings on a larger scale.

The Youngstown Sheet & Tube Co. and Carnegie Steel Co. are maintaining district plants on an 85 per cent basis.

## June Structural Sales at 66 Per Cent

WASHINGTON, June 18.—Sales of fabricated structural steel during June amounted to 66 per cent of shop capacity as against 81 per cent in May, according to reports made to the Department of Commerce by firms representing 75 per cent of the fabricated capacity of the United States. On the basis of the percentage of sales to capacity, the total sales throughout the United States would amount to 119,000 tons in June as against 146,200 tons in May and 155,340 tons in April.

Reports from 96 identical firms, with an aggregate capacity of 135,050 tons, showed the following actual sales for past three months: April, 118,911 tons; May, 109,263 tons; June, 89,974 tons. The percentage of the actual tonnage booked by firms reporting compared to their capacity for three months was as follows: April 88 per cent, May 80.9 per cent, June 66.6 per cent.

The six months business of 1922 totals upward of 710,000 tons, or nearly two-thirds fabricating capacity. The first half year contracting was greater in 1916 and 1920, but the rate as applied to a whole year was exceeded in the last decade in only 1915 and 1916. June, 1922, showed the largest total of any June for which there are records except June, 1915, in which there was a volume of 138,000 tons. The June average for the preceding decade is 95,650 tons.

## Railroad Equipment Business

A feature of the week was the placing of large orders for repairs to locomotives and freight cars.

The Baltimore & Ohio divided orders for repairs to 6000 cars and 40 locomotives. The cars were divided as follows: Koppel Car Repair Co., American Car & Foundry Co., Standard Steel Car Co. and the Pullman Co., each 1000; Youngstown Steel Car Co., Hamilton Car Co., General American Car Co. and Illinois Car & Equipment Co., each 500.

The B. & O. locomotive repairs were awarded to Baldwin Locomotive Works, which has also contracted to repair 100 engines for the Erie, 50 for the New York Central and 30 for the New York, New Haven & Hartford.

The Baldwin Works has also taken orders for 50 new locomotives for the Baltimore & Ohio and 25 for the Philadelphia & Reading.

The Norfolk & Western Railroad has ordered 1000 box cars from the Ralston Steel Car Co.

The Buffalo Creek & Gauley Railroad (owned by the Elk River Coal & Lumber Co.) has bought 300 all-steel hopper cars from the American Car & Foundry Co.

The Nashville, Chattanooga & St. Louis has ordered 750 box cars, 150 stock cars and 100 flat cars from the American Car & Foundry Co.; also 15 passenger cars from the same company.

The Illinois Central has let 600 cars for repairs to the Ryan Car Co.

The New York Central has let contracts for an indefinite number of cars for repairs, upward of 1000.

The Chicago, Indianapolis & Louisville is inquiring for 300 composite gondola cars.

## FABRICATED STEEL BUSINESS

### Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Office building for Westinghouse Electric & Mfg. Co., Thirtieth and Walnut streets, Philadelphia, 300 tons, to Bethlehem Steel Bridge Corporation.

Citizens' Hotel, Charlotte, N. C., 1000 tons, to Southern Engineering Co., Charlotte, N. C.

Public Service Corporation power station at Newark, N. J., 2000 tons, to New York Shipbuilding Corporation.

Building for Chamber of Commerce of the United States, Washington, D. C., 2000 tons, to American Bridge Co.

Shops for Long Island Railroad at Long Island City, N. Y., 400 tons, to Shoemaker-Satterthwait Bridge Co.

Bridge over the Susquehanna River in Lycoming County, Pennsylvania, 1100 tons, to Bethlehem Steel Bridge Corporation.

School No. 188, New York, 700 tons, to Bethlehem Fabricators, Inc.

State highway bridge, No. 3688, War Road, Minn., Guaranty Construction Co., general contractor, 130 tons, to American Bridge Co.

Warehouse for Appleton Coated Paper Co., Appleton, Wis., 100 tons, to Northern Boiler & Structural Iron Works.

Building for Aluminum Goods Mfg. Co., Manitowoc, Wis., 300 tons, let by Walter W. Oefflein, Inc., to Wisconsin Bridge & Iron Co.

Truxillo Railroad Co. of New York for a number of buildings for Honduras, 700 tons, to Bancroft-Jones Corporation, Buffalo, N. Y.

Transmission towers for Blackstone Valley Gas & Electric Co., 650 tons, to Bancroft-Jones Corporation.

Danville, Ill., high school, 300 tons, to Central States Bridge Co.

Tomlinson, Conn., bridge, 1300 tons, to Phoenix Bridge Co.

City of Boston, transit department, 172 tons, to Bethlehem Steel Bridge Corporation.

Euclid-Seventy Ninth Street Building, Cleveland, 470 tons, to the VanDorn Iron Works Co.

### Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

Telephone building on East Thirty-sixth Street, New York, 2000 tons.

New York Edison Co., sub-station, New York, 400 tons.

Material for repair of Queensboro bridge plaza, New York, 500 tons.

Interborough Rapid Transit Co., New York, sub-station, 500 tons.

Museum of Natural History, New York, addition, 700 tons.

Convent of the Sacred Heart, Philadelphia, 500 tons.

United Lutheran publishing building, Thirteenth and Spruce streets, Philadelphia, 1000 tons; bids close July 21.

Reformed Church building at Fifteenth and Race streets, Philadelphia, 1000 tons.

Wire mill, rod mill and train shed for Western Electric Co., 1300 tons, bids close July 21.

Freight depot, Union Pacific Railroad, Denver, Colo.

Bridge work for Cincinnati Northern Railroad, 250 tons. Mount Vernon Bridge Co. low bidder.

Viaduct for a West Virginia coal company, 100 tons; American Bridge Co. low bidder.

Dam No. 44, Ohio River, 650 tons; bids close July 17.

River work near Vicksburg, Miss., 600 tons; bids close July 26.

Roosevelt Hospital building, Dayton, Ohio, 200 tons; bids in.

State Pier, Portland, Me., 900 tons.

Michigan-Lafayette Building, Detroit, 2000 tons, bids taken.

Lima Locomotive Works, Lima, Ohio, plant addition, 2000 tons, bids taken.

Detroit baseball grandstand, 550 tons, bids taken.

St. Clair-Doan Co., Cleveland, theater and other buildings, 250 tons.

County administration buildings, Wanta, N. Y., 500 tons.

## Pittsburgh Iron and Steel Market

(Continued from page 171)

are likely. The American Sheet & Tin Plate Co. continues to quote on the basis of 3.15c. for black and 4.15c. for galvanized, but has practically no tonnage to spare this side of October. Some independent mills are quoting from \$5 to \$7 per ton advance over the above price, but to certain favored customers are quoting the same prices as the leading interest. Prices on sheets are given on page 183.

**Old Material.**—Hardly enough scrap of any kind is being sold in the local market to determine prices. Dealers say that consumers are specifying on contracts and taking in the scrap promptly, but are not in the market to buy more, preferring to await the outcome of the coal and railroad strikes. There is a scarcity in the supply of cast iron borings, and also in several grades of steel-making scrap. Heavy melting scrap sold at Youngstown last week at \$18.25 to \$18.50, but the local market is considerably lower. Cast scrap for open-hearth use is very dull and prices are purely nominal. Not much change in the local scrap market is likely, or is looked for until something definite occurs in the coal or the railroad strikes. In the absence of sales, we make no change in our scrap prices as quoted last week, except a slight reduction on heavy melting scrap.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$17.25
No. 1 cast, cupola size.....	\$19.00 to 20.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa. ....	17.00 to 17.50
Compressed sheet steel.....	15.50 to 16.00
Bundled sheets, sides and ends.....	14.50 to 15.00
Railroad knuckles and couplers.....	18.50 to 19.00
Railroad coil and leaf springs.....	18.50 to 19.00
Low phosphorus standard bloom and billet ends .....	20.00 to 21.00
Low phosphorus plates and other grades .....	19.00 to 20.00
Railroad malleable .....	16.50 to 17.00
Iron car axles.....	26.00 to 27.00
Locomotive axles, steel.....	24.00 to 25.00
Steel car axles.....	17.50 to 18.00
Cast iron wheels.....	18.50 to 19.00
Rolled steel wheels.....	18.50 to 19.00
Machine shop turnings.....	14.00 to 14.50
Sheet bar crop ends.....	18.50 to 19.00
Heavy steel axle turnings.....	15.50 to 16.00
Short shoveling turnings.....	15.00 to 15.50
Heavy breakable cast.....	18.00 to 18.50
Stove plate .....	15.00 to 15.50
Cast iron borings.....	16.00 to 16.50
No. 1 railroad wrought.....	15.00 to 15.50

### Prepaying Duties on Advertising Matter

For the information of those concerned there is reprinted from the Commerce Reports of the Department of Commerce a dispatch from the American consul at Adelaide, reading in part as follows:

"Manufacturers who go to the trouble to issue expensive catalogs and price lists often suffer a very serious disadvantage when such packages arrive addressed to Australian business men, who find that they are required to pay duty and short postage. In many cases, if he had previously been inclined to purchase in the United States the line represented by the catalog, its receipt in this manner offends him to such an extent that he refuses to give further consideration to any line that that particular manufacturer has to offer. It is therefore advisable to warn American business houses to make certain that the duty is fully prepaid and that packages bear the full amount of postage required. It should also be borne in mind that short postage which has to be paid at the other end is levied at double the regular rate."

An ore transfer car of approximately as much as 150 tons capacity is to be built for the Cambria Steel Co. by the Atlas Car & Mfg. Co.

# Prices Finished Iron and Steel, f.o.b. Pittsburgh

## Plates

Sheared, tank quality, base, per lb.....1.70c. to 1.80c.

## Structural Material

Beams, channels, etc.....1.70c. to 1.80c.

## Iron and Steel Bars

Soft steel bars, base, per lb.....1.70c. to 1.80c.

Refined iron bars, base per lb.....2.20c.

## Hot-Rolled Flats

Hoops, base, per lb.....2.50c. to 2.75c.

Bands, base, per lb.....2.50c. to 2.75c.

Strips, base, per lb.....2.50c. to 2.75c.

Cotton ties, per bundle of 45 lb.....\$1.10

## Cold-Finished Steels

Bars and shafting, base, per lb.....2.10c.

Strips, base, per lb.....4.00c.

## Wire Products

Nails, base, per keg.....\$2.40

Bright plain wire, base, per 100 lb.....2.25

Annealed fence wire, base, per 100 lb.....2.25

Galvanized wire, base, per 100 lb.....2.75

Galvanized barbed, base, per 100 lb.....3.05 to 3.15

Galvanized staples, base, per keg.....3.05 to 3.15

Painted barbed wire, base, per 100 lb.....2.55 to 2.65

Polished staples, base, per keg.....2.55 to 2.65

Cement coated nails, base, per count keg.....1.90 to 2.00

Woven fence, carloads.....73 per cent off list

## Bolts and Nuts

Machine bolts, small, rolled threads.....60, 10 and 10 per cent off list

Machine bolts, small, cut threads.....60 and 10 per cent off list

Machine bolts, larger and longer.....60 and 10 per cent off list

Carriage bolts,  $\frac{3}{8}$  x 6 in.:  
Smaller and shorter, rolled threads.....60 and 10 per cent off list

Cut threads.....60 per cent off list

Longer and larger sizes.....60 per cent off list

Lag bolts.....60, 10 and 10 per cent off list

Plow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list

Other style heads.....20 per cent extra

Machine bolts, c.p.c. and t. nuts,  $\frac{3}{8}$  x 4 in.:  
Smaller and shorter.....50 and 10 per cent off list

Larger and longer sizes.....50 and 10 per cent off list

Hot pressed square or hex. blank nuts.....\$4.50 off list

Hot pressed nuts, tapped.....\$4.50 off list

C.p.c. and t. sq. or hex. nuts, blank.....\$4.50 off list

C.p.c. and t. sq. or hex. nuts, tapped.....\$4.50 off list

Semi-finished hex. nuts:  
9/16 in. and smaller, U. S. S.....80 and 10 per cent off list

$\frac{3}{4}$  in. and larger, U. S. S.....75 and 10 and 10 per cent off list

Small sizes, S. A. E.....80, 10 and 10 per cent off list

S. A. E.  $\frac{3}{4}$  in. and larger.....75 and 10 and 10 per cent off list

Stove bolts in packages.....80 and 5 per cent off list

Stove bolts in bulk.....80, 5 and 2 1/2 per cent off list

Tire bolts.....65 per cent off list

Track bolts in carloads.....3.00c. to 3.25c. base

Track bolts, less than 200 kegs.....3.50c. to 3.75c. base

## Cap and Set Screws

Milled square and hex. head cap screws.....75 and 10 per cent off list

Milled set screws.....75 per cent off list

Upset cap screws.....80 per cent off list

Upset set screws.....80 and 5 per cent off list

## Rivets

Large structural and ship rivets, base per 100 lb.....\$2.40

Large boiler rivets, base per 100 lb.....2.50

Small rivets.....70 and 5 to 70 and 10 per cent off list

## Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb.....\$2.25 to \$2.35

Spikes,  $\frac{1}{2}$  in. and smaller, base, per 100 lb.....2.50 to 2.60

Spikes, boat and barge, base, per 100 lb.....2.50 to 2.60

Track bolts, base, per 100 lb.....3.25

Tie plates, per 100 lb.....2.00 to 2.25

Angle bars, base, per 100 lb.....2.40

## Welded Pipe

### Butt Weld

Inches	Steel	Iron		
		Galv.	Black	Galv.
$\frac{1}{4}$ to $\frac{3}{8}$	54 1/2	28 1/2	3 1/2	22 1/2
$\frac{1}{2}$	60	33 1/2	3 1/2	18 1/2
$\frac{3}{4}$	65	50 1/2	4 1/2	27 1/2
1	69	56 1/2	4 1/2	29 1/2
1 to 3	71	58 1/2		

### Lap Weld

Inches	Steel	Iron
2	64	39 1/2
2 1/2 to 6	68	42 1/2
7 to 8	65	40 1/2
9 to 12	64	

### Butt Weld, extra strong, plain ends

Inches	Steel	Iron
$\frac{1}{4}$ to $\frac{3}{8}$	50 1/2	33 1/2
$\frac{1}{2}$	56	38 1/2
$\frac{3}{4}$	62	50 1/2
1 to 1 1/2	67	55 1/2
2 to 3	69	57 1/2
	70	58 1/2

### Lap Weld, extra strong, plain ends

Inches	Steel	Iron
2	62	40 1/2
2 1/2 to 4	66	43 1/2
4 1/2 to 6	65	42 1/2
7 to 8	61	35 1/2
9 to 12	55	30 1/2

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2 1/2 per cent.

## Boiler Tubes

### Lap Welded Steel

Inches	Steel
1 1/2 in.	26 1/2
2 to 2 1/2 in.	41
2 1/2 to 3 in.	52
3 1/2 to 13 in.	57

### Charcoal Iron

Inches	Charcoal Iron
1 1/2 in.	5
1 1/2 to 1 3/4 in.	15
2 to 2 1/4 in.	25
2 1/4 to 3 in.	30
3 1/4 to 4 1/2 in.	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

## Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

Inches	Discount
1 in.	60
1 1/4 and 1 1/2 in.	52
1 1/2 in.	36
2 and 2 1/4 in.	39
2 1/2 and 2 3/4 in.	43
3 in.	47
3 1/4 to 4 in.	52
4 1/4 in. to 5 in.	44

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Tin Plate

Standard cokes, per base box.....\$4.75

## Terne Plate

(Per package, 200-lb.)

Coating	Price
8-lb. coating	\$9.30
8-lb. coating I. C.	9.60
15-lb. coating I. C.	11.80
20-lb. coating I. C.	13.00
25-lb. coating I. C.	\$14.25
30-lb. coating I. C.	15.25
35-lb. coating I. C.	16.25
40-lb. coating I. C.	17.25

## Sheets

### Blue Annealed

Nos. 9 and 10 (base), per lb.....2.40c. to 2.60c.

### Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.15c. to 3.40c.

### Galvanized

No. 28 (base), per lb.....4.15c. to 4.40c.

### Tin-Mill Black Plate

No. 28 (base), per lb.....3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

## Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.....\$0.325	Buffalo.....\$0.265	St. Louis.....0.43	Pacific Coast.....\$1.50
Philadelphia, export.....0.265	Cleveland.....0.215	Kansas City.....\$0.735	Pac. Coast, ship plates 1.20
Baltimore, domestic.....0.315	Cleveland, Youngstown.....0.19	Kansas City (pipe).....0.705	Birmingham.....0.69
Baltimore, export.....0.255	Comb.....0.295	St. Paul.....0.595	Memphis.....0.385
New York, domestic.....0.34	Detroit.....0.295	Omaha.....0.735	Jacksonville, all rail.....0.50
New York, export.....0.285	Cincinnati.....0.295	Omaha (pipe).....0.705	Jacksonville, rail and
Boston, domestic.....0.365	Indianapolis.....0.31	Denver.....1.275	water.....0.415
Boston, export.....0.285	Chicago.....0.34	Denver (pipe).....1.215	New Orleans.....0.515

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2 1/2c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

## GERMAN PRICES AGAIN RISE

Steel Prices Increased 1000 m. to Offset 400 m.  
Increase in Coal—Austria Undersells Germany

(Special Correspondence)

BERLIN, GERMANY, July 4.—When prices for semi-finished material were increased on June 20, they were based on the price of coal fixed by the Federal Coal Board on April 20, and were to remain in force until the end of July. It was stated, however, that for every 100 m. increase in the price of bituminous coal rolled material would be automatically increased 275 m. The negotiations in Berlin on miners' wages have led to an increase of about 31 per cent, which works out to 65 m. per shift increase. Bituminous coal rises from 909.50 m. (\$2) per ton to 1208 m. (\$2.68) and Rhenish lignite is 180 to 735 m. (\$0.40 to \$1.62) per ton higher. The miners' union originally asked for an increase of 35 m. to counterbalance depreciation in the purchasing power of the mark, but it was realized that unless a substantial inducement was offered, large numbers would leave the mines to take up work in industries paying higher wages. Reparations coal is drawing heavily on German coal production, and the present output could not be maintained if the ranks of the colliers were further depleted. The increase in coal prices raises rolled material by about 1000 m. (\$2.20) per metric ton. Guiding prices for basic material are now as follows per metric ton:

	Marks	
Ingot	8,520	\$18.74
Bloom	9,320	20.50
Billet	9,660	21.25
Sheet bar	9,910	21.80
Structural shapes	11,290	24.84
Bar iron shapes	11,470	25.23
Universal iron	12,470	27.43
Hoop iron	13,030	28.67
Wire rods	12,340	27.15
Sheets		
No. 6 and heavier	12,860	28.29
Nos. 6 to 11	14,610	32.14
Nos. 11 to 20	15,710	34.56
No. 20 and lighter	16,490	36.28

The surcharge for open hearth material is unaltered at 900 m. (\$1.98) per ton. The increase still leaves a margin between German and foreign prices, which is, however, further reduced by the export duty of 4 per cent and the tax on turnover of 2 per cent.

Through the recent depreciation of German currency British coal is again considerably higher than the home product but because of the coal shortage large quantities are still being imported. The Pig Iron Association lately offered 8000 tons of iron which was produced with British coal. The price was 800 m. higher than the iron produced with German coal. The association now announces the sale of another 16,000 tons with a surcharge of 500 m. per ton. Pig iron has been increased about 1000 m. per metric ton. The following table shows the prices, now in effect, in marks per metric ton:

	Marks	
Hematite	7,670	\$16.87
Foundry Iron		
No. 1	7,261	15.97
No. 2	7,191	15.82
Luxemburg	6,431	14.15
Steel making, low in copper	7,250	15.95
Siegerland, steel making	7,250	15.95
Malleable pig iron	7,590	16.70
Ferromanganese, 80 per cent	16,570	36.45
Spiegeleisen, 8 to 10 per cent	8,239	18.12
Ferrosilicon, 10 per cent	9,050	19.91

These prices are in force until further notice. The Pig Iron Association is allowing a rebate of 100 m. (\$0.22) per ton. The increase is made because of the 25 per cent rise in freight rates, wage increases and higher costs of inland and foreign ore. Scrap iron has gone up lately and is 6,400 m. (\$14.08) for cast iron, and 5,400 (\$11.88) for wrought iron. Because of the excessive prices it is intended to re-introduce rationing and Government control of scrap. In view of the rise in pig iron foundries are raising prices 15 per cent. Works have plenty of orders.

The Otto Wolff company, which with some of the largest iron and steel interests recently founded the Iron Export Otto Wolff, has acquired a controlling in-

terest in the Archimedes A. G. in Berlin, which manufactures iron and steel products. Archimedes is now increasing its capital from 6,000,000 to 30,000,000 m. Of the increase 16,000,000 will be used to combine with the Wolff company, the Düsseldorf Eisenhütte A. G., Ratingen, capital 8,000,000 m. the Hildener Schrauben und Metallwerke A. G., capital 4,000,000 m. and R. W. Schulte in Plettenberg and Düsseldorf. These three companies manufacture screws and rivets and their products are to be sold by Wolff, which is beginning to be one of the largest interests in the German iron and steel industry.

The Mannesmann company has established a new tube company in Komotau, Czecho-Slovakia, with a capital of 30,000,000 kronen.

The Society of German Rivet Works in Düsseldorf has raised the price for heavy rivets (boilers, ships, bridge work) from 19,200 to 24,000 m. per ton.

Austrian foundries, which have been obtaining their pig iron largely from Upper Silesia, are now placing large orders in the Saar district and in France, as the Silesian and the West German works cannot supply sufficient quantities. The Austrian mills are very busy as their prices are considerably below the level of the world market and are even undercutting German quotations. Dealers in Austria with stocks of Czecho-Slovakian rolled material are unable to dispose of them because of the lower domestic prices. The situation in the Czecho-Slovakian iron and steel industry has forced 17 of the 22 blast furnaces in the country out of operation.

## European and South American Fairs

Throughout the world a good many fairs and exhibitions seem to have been planned. Among them may be mentioned the following:

Hamburg, Germany, July 19 to 24, fair of electrical and other machinery.

Rio de Janeiro, Brazil, Sept. 7, 1922, to March 31, 1923, International Centenary Exhibition.

Santiago, Chile, middle of September to November, Chilean exhibition of national industries.

Breslau, Germany, Sept. 3 to 6, autumn sample fair.

Trieste, Italy, Sept. 3 to 18, general sample fair.

Naples, Italy, Sept. 16 to 30, sample fair.

Laibach, Yugoslavia, Sept. 2 to 11, sample fair.

Vienna, Austria, Sept. 10 to 16, autumn fair.

Lemberg, Poland, Sept. 5 to 15, eastern fair.

Prag, Czechoslovakia, Sept. 3 to 10, international autumn fair.

Frankfort-on-Main, Germany, Oct. 8 to 14, autumn fair.

Lyon, France, Oct. 1 to 15, international autumn sample fair.

Paris, France, Oct. 1 to 16, exhibition of agricultural machinery.

Paris, France, Oct. 4 to 15, International motor-car exhibition.

London, England, Oct. 13 to 23, international exhibition of motor trucks.

London, England, November, international motor exhibition.

Brussels, Belgium, Dec. 3 to 17, international motor car exhibition.

## Proposed Reductions on Ore Rates Again Suspended

WASHINGTON, July 18.—The Interstate Commerce Commission yesterday further suspended until Aug. 29, tariffs which proposed a reduction of 20 per cent in ex-lake ore rates and 28 per cent in Eastern ore rates. The further suspension was ordered because the commission has not completed its hearing in these cases. The proposed reductions, which were the object of prolonged hearings during the spring, were strongly supported by the railroads and iron and steel interests, except those in the Buffalo district. Since this case came before the commission, it has made a reduction of 10 per cent in rates on ore as well as other products in its general rate decision, which became effective July 1.

## NON-FERROUS METALS

### The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits		Lead		Zinc	
	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis	
July 18	14.00	13.75	31.00	5.75	5.50	5.95	5.60	
July 17	14.00	13.75	30.95	5.75	5.50	6.00	5.65	
July 16	14.00	13.75	31.00	5.75	5.50	6.10	5.75	
July 15	14.00	13.75	.....	5.75	5.50	6.10	5.75	
July 14	14.00	13.75	31.12½	5.75	5.50	6.10	5.75	
July 13	14.00	13.75	31.50	5.75	5.50	6.10	5.75	

\*Refinery quotation.

### New York

NEW YORK, July 18.

**Copper.**—A fairly well sustained demand, together with the fact that there is no surplus of copper, contributed to the continued strength of prices. Usually July is marked by weakness in prices, but the situation this year is different. Sales have been made during the past week for delivery up to the end of the year at 14c., delivered, for electrolytic, and while this price has been shaded on a few sales the price has not gone below 13.95c. Sales for export have also been made at 13.95c. and 14c., f.a.s. There is no large volume of business and buyers are disposed to be somewhat cautious, but are ready to buy for prompt shipment the copper that is available. However, there is little copper to be had from second hands.

**Tin.**—Up to Thursday the tin market was dull last week. There were sellers but no buyers. On Thursday there was a slight change for the better, a little business, possibly 100 to 150 tons, being done at 30.87½c. to 31c. Sales were made from steamers at dock and to arrive. On Friday about 100 tons was sold at 30.87½c. to 31c., while on Monday about 200 tons was sold, mostly for July-August delivery, but including August-September from the East, at 31.25c. to 31.50c. The market to-day was firm at 31.50c. London cables to-day report spot standard quoted there at £155 2s. 6d.; future standard, £155 12s. 6d.; spot straits, £156 12s. 6d.; Singapore price £156 15s.

**Lead.**—The market is quiet and dull and prices are stationary, 5.50c., St. Louis, and 5.75c., New York. It is reported that some transactions at St. Louis have been put through at 5.45c.

**Zinc.**—Publication of zinc statistics by the American Zinc Institute during the week greatly strengthened the market; at any rate the strength occurred simultaneously with the announcement of these figures, hence it is fair to assume that the better statistical position of this metal was responsible for the upturn in prices. The report stated the stocks on hand as of July 1 totaled 29,576 tons, a decline of about 11,000 tons from the June 1 figures. Shipments in June were 39,380 tons, so that the amount on hand July 1 was less than one month's supply. Prices for prompt shipment stiffened about the middle of last week, and the quotations for several days have been 5.75c., St. Louis, or 6.10c., New York.

**Old Metals.**—Prices are a little higher and business more active. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.50
Copper, heavy and wire.....	12.75
Copper, light and bottoms.....	11.00
Heavy machine composition.....	10.50
Brass, heavy.....	8.00
Brass, light.....	6.50
No. 1 red brass or composition turnings.....	8.75
No. 1 yellow rod brass turnings.....	7.50
Lead, heavy.....	4.875
Lead, tea.....	3.75
Zinc.....	3.25

**Aluminum.**—The Aluminum Co. of America continued to quote virgin metal, 98-99 per cent pure, in lots of 15 tons or more, f.o.b. shipping point, carload rate of freight allowed, at 19.10c. The same grade of imported metal is quoted at 17.75c. to 18c., duty paid, New York.

**Antimony.**—The market is quiet and unchanged, prompt carloads being quoted at 5c. per lb. or a shade under, duty paid, New York.

### Chicago

July 18.—Copper and spelter have advanced, but tin and lead are easier. Some fairly sizable inquiries are pending in spelter, but actual business is light and the market is dull. On other metals prices are unchanged except for a slight advance in copper bottoms. We quote, in carload lots, Lake copper, 14.12½c.; tin, 32c.; lead, 5.50c.; spelter, 5.75c.; antimony, 7c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9c.; red brass, 8.50c.; yellow brass, 6.75c.; lead pipe, 14.25c.; zinc, 2.75c.; pewter, No. 1, 20c.; tin foil, 22.50c.; block tin, 26c.; all buying prices for less than carload lots.

### St. Louis

July 18.—We quote lead in carload lots at 5.40c. to 5.50c.; slab zinc, 5.73c. to 5.80c. On old metals we quote light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; and aluminum, 9c.

### Effect of Manganese on the Magnetic Properties of Steel

It has been recognized for some time that manganese has an effect on the magnetic properties of steel which is of a somewhat similar nature to that of carbon. A series of iron-carbon-manganese alloys of exceptional purity have become available for a study at the Bureau of Standards of their magnetic properties. Several sets of specimens, each set having the same carbon content, but varying manganese, will be subjected to standard heat treatment and their magnetic properties determined. New apparatus for the testing of small specimens recently developed at the bureau is being used in this investigation.

### Attorney General Will Soon Report on Mergers

WASHINGTON, July 18.—Attorney General Daugherty said this afternoon that he expected to send the report of the Department of Justice regarding the investigation of proposed mergers of independent steel companies to the Senate some time this week. He stated that the draft of the report practically has been completed and but little remains to be done before it is ready to be submitted to the Senate. The Department of Justice investigation was under the Sherman anti-trust act while the investigation of the Federal Trade Commission is under the Clayton act. Both investigations were ordered by a resolution of Senator La Follette. Meanwhile the Federal Trade Commission is continuing its investigation without any indication as to when it will be completed. Its complaint against the Bethlehem Steel Co. and the Lackawanna Steel Co. was followed by the issuance of a questionnaire to all the steel companies of the country bearing on production, domestic and foreign shipments, capitalization, etc. This questionnaire has been responded to by many companies, including the United States Steel Corporation.

As yet nothing has been done to indicate what action will be taken with regard to the proposed merger of the Midvale Steel & Ordnance Co., the Republic Iron & Steel Co. and the Inland Steel Co. To-morrow counsel for these three companies will hold a conference with the Federal Trade Commission at which, it is said, explanation of data submitted by these companies will be made.

June sales of the Metropolitan Paving Brick Co., Canton, Ohio, reached 3000 carloads, establishing a new monthly record. Officials report sustained demand for road building and construction. The company operates properties at Bessemer, Pa., and in the vicinity of Canton.

## PERSONAL

Frederick R. Sites has been appointed private secretary of Judge Elbert H. Gary, chairman United States Steel Corporation, succeeding George K. Leet, who, after serving as private secretary for 11 years was elected secretary of the Steel Corporation last April. Mr. Sites graduated from the Massachusetts Institute of Technology in 1899. He served for about a year in a minor capacity at the Central blast furnaces of the American Steel & Wire Co., Cleveland, and later for about a year in the metallurgical department of the Carnegie Steel Co., Homestead, Pa. Nine years ago he became connected with the United States Steel Products Co. and has just returned from Shanghai, China, where he has been manager in China for that company. During a part of the years 1918-19, Mr. Sites was treasurer of the Federal Shipbuilding Co., but returned to China when the export business became active after the war. Judge Gary became well acquainted with Mr. Sites while making a tour of the Far East six years ago. Mr. Leet, who has been serving as private secretary to Judge Gary as well as secretary of the Steel Corporation since his election to the latter position, will now devote his entire time to the position of secretary of the Steel Corporation.

Roy H. Davis, general manager Firth-Sterling Steel Co., McKeesport, Pa., whose paper on "Brands vs. Analysis in Buying Tool Steel," read at the convention



ROY H. DAVIS

of the National Association of Purchasing Agents, Rochester, N. Y., May 17, has aroused much interest among buyers of tool steel, was born in 1885 and after 6 months' work at the University of Oregon, entered the United States Naval Academy in 1905, graduating four years later. His time in the service, 1909-13, was spent at sea and in ordnance and metallurgical work at the various steel companies which were undertaking that work. In the latter part of 1913, he became connected with the United States Coal & Coke Co., Gary, W. Va., serving as mechanical engineer and superintendent of power and

electrical engineer. In 1915 he became associated with L. J. Firth in the office of the Washington Steel & Ordnance Co., New York, as assistant to W. A. Burton. Since 1917 he has been at the McKeesport plant of the Firth-Sterling Steel Co. with the exception of several months spent in Sheffield, England.

Eugene G. Grace, president Bethlehem Steel Corporation, sailed on the Olympic, July 15, for a European trip of several weeks.

Walter W. Leck, formerly general superintendent American Tube & Stamping Co., Bridgeport, Conn., and later superintendent of rolling mills, Steelton plant, Bethlehem Steel Co., has resigned to become general superintendent, Scullin Steel Co., St. Louis.

William F. Figuee, formerly with Laughlin & Barney Machinery Co., Pittsburgh, is now connected with the sales department of Chas. A. Schieren Co., in its office in the Maloney building, Pittsburgh.

James A. McCrory, formerly secretary and general manager of sales American Steel Co., Park Building, Pittsburgh, has resigned, effective July 15. After a vacation, Mr. McCrory plans to engage in business on his own account.

Julius Kahn, president Truscon Steel Co., Youngstown, Ohio, sailed last Saturday on the Vroonland for an extended tour of Europe.

Arthur Hungerford Pullen, chairman Burton-Griffiths Co., Ltd., London, Eng., importer of machinery, spent several days in Milwaukee on a business mission with local manufacturers. The Milwaukee Association of Commerce arranged a special luncheon at the Athletic Club in his honor at which Mr. Pullen briefly discussed exporting and importing problems under present-day conditions.

W. S. Stothoff has resigned as works manager of the Hadfield-Penfield Steel Co., Bucyrus, Ohio, and will engage in other business in the East. He has been succeeded by R. O. Perrott, secretary of the company and resident manager of the Bucyrus plants who has become manager of all the plants, the others being located in Mansfield and Willoughby, Ohio. Arthur Whitcraft has become manager of the company's steel foundry in Bucyrus.

Albert E. Newton has been chosen general manager of the Collins Co., manufacturer of tools, Collinsville, Conn. Mr. Newton was for many years with the Reed-Prentice Co., Worcester, Mass.

J. S. Black has been made works manager of the Corbin Screw division of the American Hardware Corporation, New Britain, Conn., succeeding Roswell Sorrow, who recently resigned. Mr. Black was formerly associated with the New Britain Machine Co., New Britain, Conn.

Frank H. Willard has been elected vice-president and general manager Graton & Knight Mfg. Co., Worcester, Mass., belting. At the time of the reorganization of the company a few months ago, Mr. Willard resigned as vice-president and director, but remained with the company.

Henry C. Graton, founder of Graton & Knight Mfg. Co., Worcester, Mass., belting, last week celebrated his ninety-second birthday. He and Joseph A. Knight formed a partnership in 1861.

R. M. Connell, Kansas City, Mo., has been appointed trade commissioner for Sao Paulo and southern Brazil, and will leave Washington on July 20 to take up his new work. For the past year Mr. Connell was in Mexico City as assistant trade commissioner, and for several months he was in charge of the office of the commercial attaché at that post.

E. B. Phillips, of Jacksonville, Fla., has been appointed instructor in electrical engineering at Carnegie Institute of Technology, Pittsburgh. He will join the staff of the college of engineering on Sept. 1. Mr. Phillips has had teaching and practical experience. He is a graduate of Georgia Institute of Technology, class of 1917, and for two years following was an electrical engineer with the Western Electric Co., New York. During the past two years, Mr. Phillips has been instructor in electrical engineering at the United States Naval Academy, Annapolis, and at Georgia Tech.

An important change in the Department of Electrical Engineering at the Carnegie Institute of Technology next year will be the retirement of Prof. A. J. Wurtz from the staff of the department. Beginning next fall, he will devote all of his time to research work in electrical engineering for the division of co-operative research, continuing research work he has been doing on a part-time basis in the college of engineering. The acquisition of Professor Wurtz to the Research division is of particular interest to electrical engineering companies, because of his contributions to the development of electrical engineering. He is the discoverer of the five non-arcing metals, and has made many notable inventions during his career.

Frank L. Estep, junior partner of the firm of C. P. Perin and S. M. Marshall, consulting engineers, New York, whose sailing for India on July 18 was mentioned in this column in last week's issue, plans to remain a few weeks in England in connection with engineering work for the Tinsplate Co. of India. In India he will supervise the completion of construction and the starting up of the plant. He will also represent his firm while in India in connection with work being done for the Tata Iron & Steel Co., the Mysore Distillation &

Iron Works, the Indian Steel Wire Products Co., the Agricultural Implements Co., Ltd., and other enterprises.

Howard F. Deverell, vice-president and director of the Otis Steel Co., Cleveland, retired on June 30, terminating a career of 28 years of active service in that organization. Mr. Deverell's first connection with the Otis Steel Co. was in the capacity of clerk in the Chicago office in April, 1894. Two years later, he took charge of the Chicago office as district sales representative. With the closing of the office in that district, he was transferred to the main office in 1898. A few years later he was made secretary of the firm, then known as Otis Steel Co., Ltd. When the Otis Steel Co. of Ohio was formed in 1912 to supplant the Otis Steel Co., Ltd., Mr. Deverell was elected secretary and director. He assumed his duties as vice-president in 1919, in which capacity he exercised general supervision over sales and attended other executive matters. Mr. Deverell plans to devote his future time to private affairs.

W. C. Perkins was transferred on July 15 to the Pittsburgh office as district sales manager of the American Chain Co., Inc., Bridgeport, Conn. At the same time the headquarters of the Southern district office were moved to Pittsburgh, combining with the Pittsburgh organization.

Elbert H. Gary, chairman United States Steel Corporation, expects to start about Aug. 1 on a vacation to be spent in the Rocky Mountains.

## OBITUARY

WILLIAM T. MURPHY, president, Standard Machinery Co., Auburn, R. I., died at Greenfield, Mass., July 9, following a three days illness. Mr. Murphy was born in Providence 40 years ago, and graduated from Brown University in 1903. A few months later he became associated with the late Michael J. Houlihan in the construction of machinery, and eventually the machine company of which he was the head was established. He had served as a member of the State Board of Labor, as president of the Metal Trades Council, and for years was an active member of the Providence Chamber of Commerce.

HARRY R. SIDNELL, superintendent of the F. A. Colman Co., Cleveland, manufacturer of foundry equipment, died July 11, age 61 years.

BURTON CLIFTON BANGS, vice-president and purchasing agent Leavitt Machine Co., Orange, Mass., died July 13, at his home in that town after a ten-weeks' illness, age 70.

CHARLES E. THWING, former president Worcester Lathe Co., Worcester, Mass., died last week at his home in that city after a five-weeks' illness, in his sixty-first year. Mr. Thwing retired from business about five years ago.

ALFRED DAWES, Winchester, Mass., inventor of machinery for manufacturing rivets, died at his home July 12. Mr. Dawes was born in Richmond, Me., in 1836.

J. HOBART BRONSON, president, Oakville Co., manufacturer of wire and metal goods, of Oakville, Conn., died at his summer home in the Berkshire Mountains, at Litchfield, Conn., Thursday morning, July 6, after an illness of but two days. Mr. Bronson, who was 80 years old, was a prominent industrial figure in Connecticut.

The projected symposium on electro-osmosis intended for the Montreal meeting of the American Electro-Chemical Society has been abandoned owing to the inability of a number of members who were relied on to prepare papers at this time. It has, therefore, been decided to abandon the symposium so far as the fall meeting is concerned.

## Refractories Prices Irregular

PITTSBURGH, July 17.—The recent advance of \$2 per 1000 in prices of fire clay brick does not yet appear to be fully established. A few makers of high duty brick still are accepting business at \$32, and since these makers are among the largest producers, the effort of others to obtain \$34 is meeting with little success. A good many users were permitted to cover their immediate requirements at the old prices and this also is a hindrance to the establishment of the higher prices. The advances in silica brick and in magnesite and chrome brick are well held. Obligations of the makers of fire clay and silica brick are rather heavy and not a few of them are falling behind their orders because of inability to obtain a sufficient supply of labor. Some manufacturers have been obliged to raise wages to maintain their organizations, and if coal miners have present wage scales preserved still further advances in clay mine and brick plant wage scales may be necessary to narrow the gap, now unusually wide, between the two classes of labor.

We quote per 1000 f.o.b. works:		
Fire Clay	High Duty	Moderate Duty
Pennsylvania .....	\$32.00 to \$36.00	\$28.00 to \$34.00
Ohio .....	32.00 to 34.00	28.00 to 32.00
Kentucky .....	32.00 to 37.00	28.00 to 34.00
Illinois .....	34.00 to 36.00	32.00 to 34.00
Missouri .....	34.00 to 36.00	30.00 to 34.00
Silica Brick		
Pennsylvania .....		33.00 to 35.00
Chicago .....		41.00
Birmingham .....		40.00
Standard size per net ton (f.o.b. Baltimore and Chester, Pa.) .....		
		56.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.) .....		
		30.00
Chrome Brick		
Standard size, per net ton .....		42.00

## Black Sheets Easier in Valleys

YOUNGSTOWN, July 17.—In the sheet market, black sheets have been purchasable either out of stock or from new rollings at the 3.15c. basis, with deliveries possible in three to four weeks. Higher prices applied only on the smaller percentage of shipments, as indicated by the \$2.90 average on Nos. 26, 27 and 28 gage black sheets on May-June shipments.

Galvanized has been more difficult to obtain on prompt shipment, however, due more to inadequacy of pickling capacity than shortage of black sheets. Full finished sheets have been in urgent demand and because a greater profit is realized on them as compared with galvanized grades, they have been accorded preferment in pickling departments.

Certain independents have been quoting up to 4.85c. on full finished stock, base gage, which compares with the nominal 4.75c. market and the 4.50c. quotation of the leading interest.

The pipe situation is characterized as very firm, especially with regard to butt-weld sizes, with some makers committed 90 days ahead. This, coupled with sheet demand, reflects activity in new construction.

Makers of merchant bars have been falling behind on their obligations, and current interruptions to production will produce still more of a stringency in this market. Prices are trending to a 1.80c. minimum.

## Valley Scrap Market

YOUNGSTOWN, July 17.—Higher scrap prices will immediately follow any enlarged demand in wake of curtailed iron output. The market in the Valley has been ranging from \$18.50 to \$19 for heavy melting.

Russell E. Gardner, president, Gardner Motor Car Co., St. Louis, announces that sales and production for the first six months of 1922 were 50 per cent greater than they were for the entire year of 1921, that orders on hand for July exceed those of any month since the company began business and that orders already received for August are in excess for those for July. The plant here now has an average of output of 85 cars a day, and when the supply of bodies, in which there has been a shortage, becomes more easily available the production will be increased to 100 cars daily.

## PROSPEROUS INDUSTRIES

### National Industrial Conference Board Survey of Conditions

In surveying industrial conditions, the National Industrial Conference Board says:

"The week has been tense with labor difficulties. Though some of the striking railroad shop men have returned to avoid loss of seniority and other privileges, and a strike of maintenance of way men has so far been held off, a small number of stationary firemen, engineers and oilers have joined the strike and the roads are having difficulty in maintaining service. Efforts of the Railway Labor Board at conciliation have not been successful, though the question of restoration of seniority rights is reported to be the chief obstacle to agreement. The Administration is hopeful of a settlement, but the Government, according to a presidential proclamation, has ready all necessary measures to check any tendency to violence or interruption of mail traffic.

"Bituminous miners and operators having failed to agree in conference, the President has proposed resumption of work under present wage scales until Aug. 10, or until an arbitration board shall have completed a thorough investigation of the industry. Anthracite operators and miners have accepted this proposal, but the bituminous miners offered such strong objection to certain features as to constitute practical rejection of it.

"The clothing trades of New York, Philadelphia and Baltimore are faced with new strike disturbances, but textile workers in New England are reported to be returning. All but four mills in Rhode Island have resumed, though a deadlock persists in the New Hampshire mills, where the employers have refused State arbitration offers.

"Despite the handicap of labor disturbances, industry shows a steady improvement, employment continues to pick up, the demand for labor grows and the number of wage increases still continues to overbalance the number of wage reductions reported. The United States Employment Service reports employment increases in 52 of 65 leading cities, all industries but the stone, clay and glass products showing an increase. The general feeling is that if current railroad and coal problems can be satisfactorily settled, the rate of progress shown in the past month will be satisfactorily maintained and the country will be able to step clear of the depression by the fall. The greatest factors of uncertainty are felt to lie in the labor situation and in the tariff legislation contemplated in Congress.

"Abroad, the signs of more stable industrial readjustment are seen in the continued movement to lengthen working hours. The precarious financial position of Germany remains the outstanding factor in the international situation, the Hague conference having so far failed of noteworthy accomplishment."

### Record Construction First Half 1922

Building contracts awarded during June in the 27 northeastern States, according to the F. W. Dodge Co., amounted to \$343,440,000. Except for the record figures of April and May of this year, this is larger than any previous monthly total. It is only 5 per cent under the record May figure, and shows a 52 per cent increase over June of last year.

The continued high rate of activity has brought the total amount of construction started in the first six months of this year up to \$1,690,984,000, which is by far the highest figure for the first half of any year.

In the six months' record are the following items: \$682,663,000 for residential construction; \$288,932,000 for public works and utilities; \$280,329,000 for business buildings; \$164,641,000 for educational buildings, and \$123,181,000 for industrial plants, an increase of 42 per cent over the corresponding period of last year.

It seems not unlikely that the remaining summer months may show a slight falling off from the extreme high rate of activity that has prevailed during the sec-

ond quarter of the year. However, there are localities in the Middle West where the revival has not yet gained the headway that it has in the East. These places may be expected to show increases that will in a measure offset declines elsewhere.

### Plant Operations

The Nicholson File Co., Anderson, Ind., is increasing production at its local plant, with working schedule advanced from 45 to 50 hrs. a week.

The Atwater-Kent Co., Philadelphia, manufacturer of ignition equipment, etc., is working at full capacity in all departments of the plant, with an overtime schedule operative in the wireless equipment branches of the works.

The Auto Body Co., Lansing, Mich., is developing maximum capacity output for the manufacture of bodies for the Durant Motor Co.

The Lebanon Iron Co., Duncannon, Pa., has resumed operations at its plant, effective July 10, following a suspension for more than a year. The works will give employment to about 150 men.

The Remy Electric Co., Anderson, Ind., is operating at full capacity with the employment of about 1900 persons. The regular week's shut-down over the Fourth of July, as in former years, was eliminated this year owing to the rush of orders, and just the single day observed.

The John Wood Mfg. Co., Conshohocken, Pa., is running at full capacity at its plant devoted to the manufacture of metal cans for ice cream and kindred service, developing an output of about 4,000 containers daily. The plant was built during the war to manufacture steel containers for the Government, and following converted to commercial production.

The Hess-Bright Mfg. Co., Philadelphia, manufacturer of ball bearings, is working at full capacity, with regular operating force. A shortage of skilled labor for desired additions to the force is reported.

### In the Field of Labor

Greater Boston union molders have officially called off their strike and are seeking re-employment. Few of the strikers have been taken back, however, inasmuch as their places previously had been filled.

It developed at a recent meeting in union quarters that drop forgers, who went on strike against the Moore Drop Forging Co., Springfield, Mass., because of the individual contract, more than a year ago, have secured employment at other establishments in that city, as well as in Detroit, Cleveland, Pittsburgh and Plainfield, N. J.

An investigation made by the Massachusetts Associated Industries shows that industries in that State in June operated on an average of 77½ per cent of normal. Production, compared with normal, varied from 50 per cent in the metal working group to 81 to 100 per cent in other industries.

The Supreme Court of Wisconsin has affirmed without opinion a decision of the circuit court which upholds the constitutionality of the provision of the Wisconsin workmen's compensation law, giving the Industrial Commission of Wisconsin authority to impose treble the standard scheduled indemnities on a corporation or other employer, when a minor child working without a child labor permit is injured.

The contract for furnishing and erecting the piping for the north extension of the Windsor, W. Va., power station has been awarded by the West Penn Power Co. to the Pittsburgh Piping & Equipment Co., Pittsburgh, Pa., which was the piping contractor on the original installation as well as on the south extension. Each of the three installations covers two 30,000 kw. units, making a total of 180,000 kw. when the north extension is finished. An interesting feature of the new installation is the steam pressure of 350 lb. per sq. in. with 250 deg. superheat. The Sargol gasketless flanged joint will be used on the steam piping.

# Machinery Markets and News of the Works

## JULY BUSINESS IS FAIR

### Sales This Month Compare Favorably with June Despite Strikes

#### Automobile Companies Buying, But Railroad Purchases Are Being Deferred, Except Santa Fe

The automobile industry continues to buy considerable machine-shop equipment and is the mainstay of the machine-tool market in the Central States, though there is a fairly good volume of buying in other lines as compared with June, which was the best month the industry has had in a year and a half. Undoubtedly the coal and railroad strikes are holding back a good deal of business, railroad buying in particular having been deferred until a settlement of the labor troubles has been reached. The Santa Fe has gone ahead with its purchases. Thus far this road has closed for more than half of the items for which it inquired. Its total expenditure for tools and cranes will be \$200,000 to \$250,000.

## New York

NEW YORK, July 18.

The volume of machine-tool business that has been done so far this month, in comparison with that of June, is fairly encouraging considering the increasing uncertainties arising out of the coal and railroad strikes. Buying is mostly in small units, but more manufacturers are indicating their need of new shop equipment. A fairly large number of inquiries remain to be acted upon as soon as manufacturers can go ahead with more assurance than is possible to-day. The Newark schools placed orders last week for about \$25,000 worth of machine tools and about \$10,000 worth of accessories and supplies for its vocational training schools. The business was split up among several manufacturers and dealers. There is a cessation of railroad buying, due undoubtedly to the shop mechanics' strike. The New York Central has bought two turret lathes and the Central Railroad of Vermont has ordered a 1500-lb. steam hammer.

Although the crane market is generally quiet, the condition is attributed to the usual summer dullness, combined with the uncertainties of the strike situation, there is some business being closed and a few new inquiries. One of these now current is for a 10-ton, 44-ft. span electric crane from the American Car & Foundry Co., New York. The Newport News Shipbuilding & Drydock Co., Newport News, Va., which is buying a list of machine tools and cranes for its car shop is receiving bids on a small list of electric hoists. An inquiry for a 110-ton power house crane and another calling for one 40-ton electric crane are reported to be current. Among recent sales are the following:

Pawling & Harnischfeger Co., a 5-ton, 62-ft. span electric crane to the Kleckhefer Container Co., Milwaukee, Wis.

Industrial Works, a 150-ton wrecking crane to the Grand Trunk Railway System, Montreal, and a

There has been other scattered railroad buying. The New York Central, the Central Railroad of Vermont and the Rutland Railroad are among those which have made small purchases.

The automobile buying of the week has been chiefly in the Cleveland market. The Toledo Chevrolet Motor Co., Toledo, Ohio, has bought 12 multiple spindle drilling machines; the General Motors Co. has bought six special Rockford boring machines for its Chevrolet plant at Flint, Mich., both orders going to a Cleveland machinery dealer. The Studebaker Corporation, South Bend, Ind., is figuring on additional equipment, including a number of grinding machines. The Continental Motors Co., Muskegon, Mich., is placing orders from week to week.

A turret lathe manufacturer has booked an order for 14 machines for shipment to Montreal, Canada.

The Cleveland Board of Education has rejected bids on about 30 tools and will receive new bids up to Aug. 14. The Newark schools have bought about 20 tools, totaling about \$25,000, for vocational training work. Berlin, N. H., schools have bought about \$17,000 worth of tools and trade schools at New Britain, Conn., have bought several machines.

160-ton wrecking crane to the Canadian Pacific Railway Co., Montreal, Can. Also a 15-ton, 45-ft. boom locomotive crane with bucket to the Dominion Construction Co., for Niles, Ohio, a 20-ton locomotive crane to Louis Caplan, Lebanon, Pa., and a 15-ton, 50-ft. boom locomotive crane to the Duluth-Superior Dredging Co., Duluth, Minn.

Shepard Electric Crane & Hoist Co., a 5-ton, 32-in. span electric crane to the Meeker Union Foundry, Norwalk, Conn.

Bedford Foundry & Machine Co., a 50-ton, 70-ft. 9-in. span overhead traveling crane with 15-ton auxiliary to the Central Penn Power Co., Saxton, Pa.

Ohio Locomotive Crane Co., a 20-ton, 50-ft. boom locomotive crane with Hayward bucket to the Central Penn Power Co., Saxton, Pa.

Niles-Bement-Pond Co., a 10-ton, 80-ft. span, electric crane to the M. W. Kellogg Co., Jersey City, N. J., and a 4-ton, 48-ft. span, hand power crane to W. R. Grace & Co. for export to Peru.

The General Motors Corporation, 224 West Fifty-seventh Street, New York, will remove the machine shop and parts department of its Buick Motor Co. division from the building at Fifty-second Street and the Hudson River to the new six-story building on Eleventh Avenue and Fifty-fifth Street, ground for which recently was broken. The capacity will be increased at the new location and additional machinery installed. The service and parts departments of the Oakland Motor Car Co. division will be established also in the new building, which will have a total floor area of 140,000 sq. ft. Both plants will be entirely separate and complete in themselves. It is expected to have the structure ready for occupancy early in the fall.

The Coffield Radio Equipment Corporation, Ellenville, N. Y., is planning for the installation of machinery for the manufacture of wireless instruments and apparatus.

A power house will be installed at the new four-story and basement plant to be erected on Mill Street, Poughkeepsie, N. Y., by the American Chocolate Products Co., 158 Broadway, New York, estimated to cost about \$350,000. Andrews, Towers & Lavalley, 21 East Fortieth Street, New York, are architects and engineers.

John L. Miller, 1947 Broadway, New York, is having

plans completed for a one-story automobile service and repair building, 125 x 150 ft., at West 210th Street, Tenth Avenue and Broadway, estimated to cost close to \$75,000. Frank Hausle, 81 East 125th Street, is architect.

The Baragua Sugar Co., 25 Broad Street, New York, a subsidiary of Punta Alegre Sugar Co., Camaguey Province, Cuba, is disposing of a bond issue of \$4,500,000, a portion of the proceeds to be used for extensions and betterments and additions to working capital. Edwin F. Atkins is president.

The New York Edison Co., 130 East Fifteenth Street, New York, has plans under way for a new three-story power house, 45 x 125 ft., at 12 Stone Street, estimated to cost about \$90,000. William Whitehall, 709 Sixth Avenue, New York, is architect and engineer.

Charles Serota, 1575 President Street, Brooklyn, has plans nearing completion for a one-story automobile service and repair works, 100 x 100 ft., on Chauncey Street. Charles Goodman, 375 Fulton Street, is architect.

The Ford Motor Co., Highland Park, Mich., has awarded contract to the Fred T. Ley Co., Springfield, Mass., for two buildings, each one-story, 110 x 120 ft., at its new plant at Green Island, N. Y., used for the manufacture of ball and roller bearings, automobile and tractor parts, etc. A store house and concrete dock will also be constructed at this time, and other factory structures later. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

The Jane Street Garage, Inc., New York, recently organized, has leased the two-story building now being erected at 11-19 Jane Street, for the establishment of an automobile service and repair works. The company is headed by H. J. Schaus and W. G. Stira, and is represented by I. L. Broadwin, 55 Liberty Street.

The New York Steam Co., 280 Madison Avenue, New York, operating power plants for general commercial service, has acquired two-five-story buildings, 43 x 122 ft., at 222-26 Pearl Street, adjoining its present property, for proposed extensions.

The New Jersey Concrete Products Corporation, Dover, N. J., has acquired the plant of the Pre-Cast Concrete Co., near Dover, for expansion in the line of pre-cast structural concrete and kindred products.

A vocational department will be installed in the new two-story and basement high school at Bridgeton, N. J., 61 x 195 ft., for which ground will be broken at once. It is estimated to cost about \$225,000. Ritter & Shay, North American Building, Philadelphia, are architects.

The Thomson Machine Co., 298 Main Street, Belleville, N. J., manufacturer of bakers' machinery, has awarded contract to the John W. Ferguson Co., Paterson, N. J., for a two-story addition, totaling about 75,000 sq. ft. of floor area, estimated to cost about \$150,000, including equipment.

The Edison Lamp Works of the General Electric Co., Harrison, N. J., has acquired about 175 acres at Parsippany, N. J., for future expansion. Plans are being prepared, it is said, for a number of buildings and as soon as these are completed an official announcement will be made.

D. W. May, Inc., Newark, N. J., operating an automotive electrical repair and service works, has removed to its new building at 319-25 Central Avenue, where 10,000 sq. ft. of floor area will be provided for extensions in the different departments, including machine repair, lighting and starting equipment, etc.

A vocational department will be installed in the three-story and basement high school to be erected on Northfield Avenue, West Orange, N. J., estimated to cost about \$400,000. Guilbert & Betelle, 546 Broad Street, Newark, N. J., are architects.

The Board of Education, City Hall, Newark, will take bids until July 27 for vocational equipment, including hand and other tools for machine shop, electrical shop, wood-working department and automobile repair shop; electrical instruments; electrical equipment; wood-working benches and wood-working machinery; sterilizer and stand, and other equipment. The new Seymour Vocational School has been completed, and equipment will be installed so as to have the structure ready for occupancy in the fall. R. D. Argue is secretary.

The Chemical Treatment Co., Newark, manufacturer of specialties for the treatment of iron and steel, has leased the three-story and basement building at 264-68 Jelliffe Avenue, totaling about 13,000 sq. ft. of floor area, and adjoining land, 105 x 250 ft. The latter property will be used for the erection of an addition later. Joseph D. Sears is one of the heads of the company.

A power house, 33 x 45 ft., will be erected in connection with the new three-story hospital to be built by the Vineland Hospital Association, Vineland, N. J., estimated to cost about \$150,000. Stern & Woodnut, Stephen Girard Building, Philadelphia, are engineers.

## Chicago

CHICAGO, July 17

THE Santa Fe has made further purchases against its inquiry and thus far has closed for more than half of the items listed, with the probability that the remainder will be bought in the coming week. The road's total expenditures for the tools and a 150-ton crane also on inquiry, will range from \$200,000 to \$250,000. The shopmen's strike is interfering with the placing of other pending lists, as the mechanical departments and, in some cases, railroad clerical forces, generally are being enlisted to do the shop work which is absolutely essential to keep trains running. Action on the Union Pacific and Burlington inquiries has been definitely postponed while it is beginning to appear unlikely that the Illinois Central will place orders for some time.

Local dealers continue to report a slow improvement in trade from miscellaneous sources, although new inquiries are not so plentiful as in June. It is notable, however, that considerable equipment which has been pending for several weeks is now being purchased with the result that total sales for July are expected to be larger than in June. One representative machine tool house has thus far booked 75 per cent of its aggregate sales in the entire month of June. The Studebaker Corporation, South Bend, Ind., and the Continental Motors Co., Muskegon, Mich., continue to place a few orders from week to week, rather than to make large purchasers at one time.

Radial drill manufacturers have generally advanced their prices five per cent. Additional companies which have announced advances include the Carlton Machine Tool Co., the Cincinnati Bickford Tool Co. and the Drees Machine Tool Co., all of Cincinnati, and the Western Machine Tool Works, Holland, Mich. Other price changes include a reduction of five per cent on emery grinders by the Ramson Mfg. Co., Oshkosh, Wis., and an advance of about 10 per cent by the Dalton Mfg. Corporation, South Beach, Conn., on its 6-in. type "TL" motor-driven engine lathe only.

The Whiting Corporation has sold a No. 6 cupola and a tumbling barrel to the Bucyrus Co., South Milwaukee, Wis., and a 3-ton overhead electric traveling crane to the Kellogg's Toasted Corn Flake Co., Battle Creek, Mich.

The Roach-Appleton Mfg. Co., 2446-56 North Crawford Avenue, Chicago, recently incorporated with \$100,000 capital stock, will manufacture electrical specialties and protecting materials and also special stampings and assemblies. It has taken a five-year lease on the plant at the address given, which contains 13,000 sq. ft. of floor space with a switch track connection on the Chicago, Milwaukee & St. Paul Railroad. Purchases of punch and drill presses and tool room equipment have been made. The officers are Ernest G. Appleton, president and treasurer; Walter O. Roach, vice-president and general manager, and John N. Willson, secretary. All of these men were formerly employed by the Chicago Fuse Mfg. Co., Mr. Appleton as superintendent, for the past 25 years; Mr. Roach as assistant general sales manager and Eastern sales manager during a period of 10 years, and Mr. Willson, as purchasing agent for four years.

The American Medical Association, 535 North Dearborn Street, Chicago, has let the general contract for a six-story mercantile building at 535 to 538 North Dearborn Street, to cost \$350,000, to R. C. Wieboldt Co., 1534 Van Buren Street, Chicago.

The Chicago By-Products Coke Co., 122 South Michigan Avenue, has awarded contract to the Koppers Co., same address, for a one-story first aid building at 3524 South Crawford Avenue, to cost \$9,000 and for a garage near Crawford Avenue and Thirty-fifth Street to cost \$5,000.

C. W. Lampe, 155 North Clark Street, Chicago, is completing plans for a one and two-story addition to the furniture factory of Fenske Brothers, 1666 McHenry Street, to cost \$20,000.

The Broline, Nolan Co., 5 North LaSalle Street, Chicago, has the general contract for a two-story factory, 100 x 125 ft., at 3317 and 3319 Elston Avenue, for Pelton & Pelton, to cost \$65,000.

Fugard & Knapp, 212 East Superior Street, Chicago, have

taken bids for a three-story printing plant, 80 x 100 ft., on the corner of North Franklin and Locust streets, for the Neely Printing Co., 412 Orleans Street, to cost \$100,000.

The Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, will take bids before the close of the month for the first unit of its new steam-operated electric power plant on Greenwood Avenue, Waukegan, Ill., to be 100 x 300 ft., and estimated to cost close to \$1,000,000, including machinery. H. Van Holst, company address, is engineer.

The Denver & Salt Lake Railroad, Denver, Colo., has preliminary plans for rebuilding its shops at Utah Junction, destroyed by fire, July 4, with loss of about \$700,000.

The Washington Foundry Co., Washington and Eagle streets, St. Paul, Minn., has awarded contract to the F. J. Bomer Construction Co., 190 Ramsey Street, for a one and two-story addition, 75 x 165 ft., and 22 x 100 ft.

The Northern States Power Co., Minneapolis, Minn., is disposing of a bond issue of \$2,000,000, a portion of the proceeds to be used for extensions and improvements.

The Sager Metal Weather Strip Co., 190 North State Street, Chicago, has leased a floor at 162 West Austin Avenue for extensions.

Plans are being completed for a municipal electrically operated pumping plant at Waukegan, Ill., in connection with filtration plant and intake, estimated to cost about \$950,000, including machinery. M. J. Dothit is city engineer in charge; Hoad, Decker & Drury, 303 South State Street, Ann Arbor, Mich., are consulting engineers.

The Watab Paper Co., Sartell, Minn., has arranged for a bond issue of \$1,250,000, a portion of the proceeds to be used for extensions and improvements. David E. Town is president.

The Duluth Motor Co., Duluth, Minn., has preliminary plans for a new two-story service and repair building, 100 x 150 ft., on First Avenue, estimated to cost about \$75,000. Ellingsen & Erickson, Lonsdale Building, are architects.

The Mutual Oil Co., Denver, Colo., operating oil refineries, is arranging for an increase in capital from \$15,000,000 to \$30,000,000, a portion of the proceeds to be used for plant extensions and improvements, and the purchase of additional properties.

A vocational department will be installed in the new high school to be erected at Litchville, N. D., estimated to cost about \$600,000, for which bids on a general contract are being asked up to July 24. W. D. Gillespie, Fargo, N. D., is architect.

Motors, power equipment, ovens, conveying machinery and other mechanical equipment will be installed in the new two-story plant, 100 x 193 ft., to be erected by the Maier-Roedel Baking Co., Inc., 5029 North Western Avenue, Chicago, estimated to cost about \$165,000, including machinery.

The Iowa Traction Co., Cedar Rapids, Iowa, has preliminary plans under way for a new hydroelectric generating plant on the Des Moines River, near Boone. J. D. Wardle, company address, is engineer.

## Buffalo

BUFFALO, July 17.

The Pioneer Paper Co., Inc., Ballston Spa, N. Y., is desirous of securing a small amount of fabricated steel, together with one or more wooden tanks.

The Ilex Mfg. Co., 726 Portland Avenue, Rochester, N. Y., manufacturer of camera shutters and other precision equipment, has plans under way for the erection of a three-story addition, 85 x 220 ft., estimated to cost about \$200,000, including machinery.

The Gallagher Motor Corporation, Rochester, care of Carl Ade, 344 East Avenue, architect, has awarded contract to the Henry Stallmans' Sons Co., Arlington Building, for a two-story automobile service and repair works, 70 x 160 ft., on Monroe Avenue.

The Board of Education, 1401 Telephone Building, Buffalo, will take bids until July 26 for equipment for the several vocational schools, and until July 24 for drafting and drawing room supplies required from July, 1922, to April, 1923. D. J. Sweeney is deputy superintendent of business and accounts, in charge.

The Retsof Mining Co., Retsof, N. Y., will build a one-story machine shop in connection with its new salt mining and refining plant. With machinery, it will cost in excess of \$100,000.

A vocational department will be installed in the new high school, two-stories, 80 x 180 ft., to be erected at Solvay, N. Y., estimated to cost about \$400,000, for which bids will be asked this month. M. L. King, Snow Building, Syracuse, N. Y., is architect.

Townsend, Krug & Green, Perry, N. Y., manufacturers of cutlery, have established a branch plant at Hamilton, Ont.

The Hodes-Zinc Co., Fremont, Ohio, manufacturer of automobile equipment and accessories, is considering plans for a branch factory at Erie, Pa.

The board of managers, State School for Mental Defectives, Rome, N. Y., will take bids until Aug. 7 for engines and electric generators for installation at the power plant of the institution. L. F. Pilcher, Capitol Building, Albany, N. Y., is State architect. Charles Bernstein is superintendent.

The Deffance Paper Co., Walnut Avenue, Niagara Falls, N. Y., has awarded contract to Braas Brothers, 1110 Whitney Avenue, for a one-story paper mill addition, 50 x 200 ft., estimated to cost close to \$200,000, including machinery and alterations in the present mill.

E. P. Leitz, 463 Connecticut Street, Buffalo, is arranging a list of machine tools, bench tools, etc., for installation at his automobile service and repair shop on Genesee Street.

The Niagara Falls Power Co., Niagara Falls, N. Y., has ordered a 70,000-hp. generator for its hydroelectric power plant extension to the Allis-Chalmers Mfg. Co., Milwaukee, Wis., at a cost of about \$850,000. Two other units of approximately the same size have been ordered from the General Electric Co., Schenectady, N. Y., for use at the same station.

Conveying and hoisting equipment, finishing and polishing machinery, etc., will be installed in the new plant of the Lautz Marble Co., 861 Main Street, Buffalo, estimated to cost about \$85,000.

Bids are being asked by the National Biscuit Co., Buffalo, for a one-story automobile service and repair building, 120 x 125 ft., on Urban Street, for company cars and trucks. Headquarters are at Tenth Avenue and Fifteenth Street, New York. A. G. Zimmerman, company address, is architect.

The Rochester Gas & Electric Co., Rochester, will install new equipment at its power plant, including electrical and steam apparatus to utilize surplus hydraulic power. F. J. Howes is chief engineer.

## Philadelphia

PHILADELPHIA, July 17.

The Hellwig Silk Dyeing Co., Ninth and Buttonwood streets, Philadelphia, has awarded contract to F. W. Van Loon, Perry Building, for a one-story machine shop, 40 x 240 ft., to cost about \$45,000. A portion of the building will be used for a service works for company automobiles.

George D. Ellis & Sons, Inc., 309 North Third Street, Philadelphia, manufacturer of tin cans, etc., is planning for the installation of additional equipment.

The Philadelphia Electric Co., Tenth and Chestnut streets, Philadelphia, has arranged for an increase in capital from \$60,000,000 to \$67,085,000, a portion of the proceeds to be used for extensions and improvements. A new power house will be erected on Race Street to cost about \$70,000, and work will soon commence on an addition to the Franklin power station, Sixth Street. A new power house will be built at American and Susquehanna avenues.

The Universal Service Motors Co., 1407 Locust Street, Philadelphia, has awarded contract to P. M. Sax, Penfield Building, for an addition to its works at Seventeenth and Manning streets, comprising a six-story and basement building, 70 x 117 ft. William M. Godfrey is president.

The Wills Sainte Claire Co. of Pennsylvania, 2033 Market Street, Philadelphia, manufacturer of automobiles, has leased a portion of the new building to be erected at 207-209 North Broad Street for a new service and repair branch.

Proctor & Schwartz, Inc., Seventh Street and Tabor Road, Philadelphia, manufacturer of drying machinery, is arranging for a merger with the Smith & Furbush Machine Co., Hancock and Somerset streets, manufacturer of textile machinery, in which it has held a controlling interest for a number of years. The consolidated company will be capitalized at \$2,500,000, and will be operated under the first noted name. Plans are under way for extensions in the works at Seventh Street and Tabor Road. Upon completion, the Smith & Furbush plant will be removed to this location and the present plant discontinued. Walter M. Schwartz will be president of the combined company, and Frank E. Schermerhorn, secretary and treasurer.

The Fidelity Machine & Mfg. Co., 4015 Paul Street, Philadelphia, will break ground at once for a new one-story and basement plant, 86 x 200 ft., at Frankford Avenue and Wheatshaf Lane, estimated to cost about \$60,000. John M. Higginbotham is president.

The R. B. Dutt Co., 1736 North Mascher Street, Philadelphia, will commence the immediate erection of a one-story power house at its dye works.

The Delaware County Electric Co., Lansdown, Pa., has arranged for an increase in capital from \$12,800,000 to

\$15,000,000, a portion of the proceeds to be used for extensions and improvements.

The De Zeng-Standard Co., Camden, N. J., has taken out a State charter to manufacture surgical, medical and optical instruments and parts. A plant is now in operation on East State Street and work will commence at an early date on a branch plant at Geneva, N. Y., to cost about \$50,000. The company is headed by Henry L. De Zeng, Charles H. Kerr and Samuel W. Cafferty.

The Trent Tile Co., Flagg Avenue, Trenton, N. J., will commence the immediate erection of a one-story power house.

Thomas J. Lee and associates, Philipsburg, Pa., are arranging for the reorganization of the Nickel Fabricating Co., whose plant recently was acquired under bankruptcy proceedings. It is proposed to change the name of the company, remodel the works and commence production at an early date.

Work will soon commence on a new power house, 100 x 130 ft., at the plant of the Scranton Lace Co., Scranton, Pa., estimated to cost about \$150,000, including a 150-ft. stack. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects. Paul B. Belin is general manager.

The Lexington Motor Co. of Pennsylvania, 851 North Broad Street, Philadelphia, manufacturer of automobiles, has acquired the building at 4624-28 Chestnut Street, totaling about 20,000 sq. ft. of floor space. It will be remodeled as a service and repair works, to include a complete machine shop.

The McGann Mfg. Co., York, Pa., is planning for the installation of a 10-ton electric traveling crane.

The Excelsior Electric Light, Power & Gas Co., 834 Land Title Building, Philadelphia, is perfecting plans for a merger with other electric power companies operating in the West Rockhill Township district, including the West Rockhill Township Electric Light & Power Co., and the East Rockhill Township Co. The new corporation will be known as the Excelsior Electric Light & Power Co., and has plans under way for extensions and improvements. Daniel W. Simkins is secretary.

Bernard S. Pincus, Twenty-first and Market streets, Philadelphia, operating a provision business, will commence the immediate erection of a new two-story ice and cold storage plant at 454-58 North American Street, estimated to cost about \$85,000.

The State Board of Control, Administration Building, Scranton, Pa., will soon commence the installation of new equipment at the power house at Adams Avenue and Gibson Street, estimated to cost close to \$60,000. J. H. Williams, 425 Washington Avenue, is president of the board.

The Pennsylvania Edison Co., Easton, Pa., has arranged for a bond issue of \$57,000, the proceeds to be used in part for extensions and improvements.

A two-story and basement service building, 45 x 75 ft., with machine department, will be constructed by the Western Union Telegraph Co., 195 Broadway, New York, at Harrisburg, Pa., estimated to cost about \$40,000. Stone & Webster, Inc., 147 Milk Street, Boston, is engineer.

The Susquehanna Castings Co., Wrightsville, Pa., is arranging a list of equipment for installation at its proposed foundry at New Oxford, Pa.

Fire July 14, destroyed the plant of the Nitroloid Corporation of America, Stroudsburg, Pa., manufacturer of composition products, with loss estimated at \$250,000, including machinery.

In connection with remodeling and improving the Driscoll Building, South Cameron Street, Harrisburg, Pa., by the State Motors Co., representative for the Chevrolet automobile, a complete machine and repair shop will be operated on the second floor, while the third floor will be given over to a parts department and auxiliary service works. N. K. van Der Zee is local manager.

Fire, July 11, destroyed the brass foundry at the plant of Orr & Sembower, Inc., Millmont, Pa., manufacturer of boilers, tanks, stacks, etc. An official estimate of loss has not been made.

The Keystone Carbonic Gas Co., Inc., Security Trust Building, Harrisburg, Pa., is taking bids on separate contracts for its new plant at Highspire, for the manufacture of carbonic gas, commercial oxygen, etc. The main building will be 60 x 140 ft. The plant is estimated to cost in excess of \$300,000, including machinery. C. J. Smith, company address, is architect and engineer. S. S. Bailey is president.

Fire, July 10, destroyed a portion of the planing mill of Reitz & Snyder, Palmerton, Pa., with loss estimated at about \$75,000, approximately \$25,000 representing machinery.

## Cleveland

CLEVELAND, July 17.

THE automobile industry continues to buy considerable equipment. The Toledo Chevrolet Motor Co., Toledo, Ohio, has purchased 12 multiple drilling machines from the National Automatic Tool Co., Richmond, Ind., and the General Motors Corporation purchased six special Rockford boring machines for its Chevrolet plant in Flint, Mich., both orders being placed with a Cleveland machinery house. A turret lathe manufacturer has booked an order from Montreal for 14 machines. The Studebaker Corporation, South Bend, Ind., is figuring on a number of grinding machines and will probably purchase additional equipment. There is considerable demand, particularly from the automobile field, for special single purpose machines for production work. Many manufacturers in this field are looking for equipment which will enable them to reduce production costs.

The coal and railroad strikes are apparently having the effect of reducing machinery business. Some buyers who have had inquiries out show a hesitancy about placing orders because they feel that the strike situation may have some effect on general business conditions. There is also some evidence of the usual summer lull and the volume of sales is showing some falling off as compared with June. The Cleveland Board of Education has rejected bids for about 30 machine tools and will receive new bids Aug. 14.

The F. P. Screw Co., East Seventy-ninth Street, Cleveland, manufacturer of cap and set screws, is enlarging its plant by an addition providing 5000 sq. ft. of floor space for manufacturing purposes. It recently purchased the equipment of the Cleveland Valve & Mfg. Co.

The Commercial Galvanizing & Mfg. Co., Warren, Ohio, has been incorporated with a capital stock of \$50,000 and will erect a plant near the Warren Tool & Forging Co., to manufacture containers for transporting oil, petroleum and tar, together with a galvanizing department. T. E. Bromley, J. J. Hehet, B. F. Fletcher, R. C. Kunlow and Frank Baker are the incorporators.

The International Lead Refining Co., a subsidiary of the Anaconda Copper Mining Co., has acquired a site at Bettes Corners, Akron, Ohio, on which it will shortly commence the erection of a plant to manufacture zinc oxide. Four structural buildings will be erected.

The Hermann Tire-Building Machine Co., Columbus, Ohio, has purchased the A. R. McDonald machine shop, St. Marys, Ohio, for the manufacture of tire building machinery. Walter H. Hermann is president.

F. E. Myers & Brother, Ashland, Ohio, have had plans prepared for a foundry addition.

The Ford Motor Co., Detroit, is considering the rearrangement of handling raw material in its River Rouge foundry and recently sent out an inquiry for a car dumper with a view of using this for unloading the pig iron, coke and other raw material.

## Detroit

DETROIT, July 17.

The Barton Auto Top Co., 4445 Woodward Avenue, Detroit, has awarded a contract to W. M. Pratt, Penobscot Building, for a new three-story plant, 62 x 160 ft., on West Canfield Avenue, estimated to cost about \$50,000, including equipment. Albert Barton is president.

The Detroit Stoker Co., 7342 Woodward Avenue, Detroit, has acquired the plant of the Van Blerck Motor Co., Monroe, Mich., for the establishment of new works. It plans to install equipment and commence operations at an early date. Employment will be given to about 200.

The Ford Motor Co., Highland Park, Mich., has completed plans for the construction of a new one-story laboratory and mechanical research plant, 200 x 300 ft., estimated to cost about \$500,000, including equipment. It will replace 13 temporary buildings of this character erected during the war. The company is reported to have preliminary plans under consideration for the erection of a new assembling plant, on site to be selected in Mexico.

The Aetna Portland Cement Co., 412 Union Trust Building, Detroit, is laying foundations for the initial buildings at its new plant on property recently acquired at Essexville, Mich., estimated to cost close to \$1,000,000. It will include a

number of cement mills, machine shop, power plant and other structures.

The Auto Specialties Mfg. Co., St. Joseph, Mich., manufacturer of automobile jacks, shock absorbers and kindred equipment, is disposing of a bond issue of \$350,000, a portion of the proceeds to be used for extensions and improvements. J. W. Tiscornia is vice-president.

A detached power plant will be erected in connection with the new two-story high school to be constructed on the East side, Saginaw, Mich., estimated to cost about \$250,000. J. F. Fuchsinger, 114 South Jefferson Street, is architect.

The Hupp Motor Car Corporation, Milwaukee and Mt. Pleasant avenues, Detroit, is clearing the site adjoining its plant preparatory to the erection of its proposed new unit, estimated to cost about \$2,000,000, including machinery. Charles D. Hastings is president and general manager.

The Fisher Body Corporation, General Motors Building, Detroit, is perfecting plans for the erection of additional units to the new plant now in course of erection at Junction Avenue and the Michigan Central Railroad, to be occupied by its subsidiary organization, the Shepard Art Metal Co., with present plant at Grand Boulevard and Hastings Street. The first unit will have a total area of about 100,000 sq. ft., all of which will be given over to the manufacture of hardware specialties, locks, etc., for automobile body construction. Later units will increase the floor space to about 250,000 sq. ft. The Fisher company has acquired the plant and business of O. J. Beaudett & Co., Pontiac, Mich., manufacturers of automobile bodies, and will continue the works as one of its divisions. The Pontiac plant approximates 300,000 sq. ft. of floor space, and will give employment to about 1500.

## New England

Boston, July 17

THE machine tool situation in this section is more encouraging. The market is far from active, but enough equipment has been moved the past week to lead the trade to believe that July bookings will be larger than anticipated early in the month. Some machine tool builders as a result of the strike are securing shop work direct from the railroads and from car repair interests engaged in special work for the carriers, making it necessary to take on additional men in some instances. The Rutland Railroad apparently is better off for mechanical help than other New England transportation companies, its shop force being about 80 per cent. of normal. The Boston & Maine is concentrating its efforts on securing help in one Massachusetts shop where it has 1000 mechanics, contrasted with 3000 before the strike.

In going business new tools have again led used machinery. Sales the past week include a 1500-lb. steam hammer, 2-in. turret machine, 20-in. lathe, Warner & Swasey chucking machinery and a structural steel shear taken by the Central Vermont Railroad; a 400-ton wheel press and two small grinders sold to the Rutland Railroad; a new hack saw, used 22-in. planer, two used 14-in. lathes, a new 12-in. shaper, new sensitive drill with single spindle and a new arbor press for New Britain, Conn., trade school purposes; 23 miscellaneous machine shop tools, blacksmith equipment and \$1,300 worth of supplies, the whole amounting to a little less than \$17,000, taken by the Berlin, N. H., Board of Education. The machine tools were divided among five local dealers, the largest amount going to any one being approximately \$3,000. Other sales include a new 14-in. lathe and four screw shaving machines to a Massachusetts concern about to engage in special piston ring grooving work; a new large multiple drilling machine to a Providence firm and several new and used single machines. A better demand for wood-working equipment is reported. New inquiries include one for complete machine shop equipment from India.

The price situation on new tools appears stronger.

Coal handling machinery is wanted by the Boston Elevated Railway, 108 Massachusetts Avenue, Boston, for its South Boston plant.

Bids closed last week on a three-story, 43 x 102 ft. addition to the State trade school, New Bedford, Mass.

The New York, New Haven & Hartford Railroad this

week will reopen its Norwood, Mass., steel car shops, closed since Dec. 24, 1921.

The American Can Co. has taken a long-term lease from the Boston Wharf Co. of the six-story and basement building at 22-24 Midway Street, South Boston.

The New Bedford Textile School, New Bedford, Mass., is planning the erection of a four-story brick and steel addition. Leary & Walker, Times Building, New Bedford, are the engineers. Contract will be awarded shortly.

The Bridgeport Furnace Works, Bridgeport, Conn., is removing to a new plant at 1661 Main Street, from 187 Congress Street, and will install equipment to manufacture iron elbows and other furnace fittings.

The Quincy Electric Light & Power Co., Quincy, Mass., has received permission to issue capital stock for \$140,000, and bonds for \$250,000, a portion of the proceeds to be used for extensions and improvements in plant and system.

The Connecticut Light & Power Co., West Main Street, Waterbury, Conn., has plans under way for a new electric generating plant on the east side of the Housatonic River, near Devon, estimated to cost in excess of \$400,000.

The Military Emergency Board, State Armory, Hartford, Conn., has awarded contract to Payne & Keefe, Manwaring Building, New London, Conn., for a new one-story mechanical building, 85 x 150 ft., at Branford, Conn., to cost about \$40,000.

The Safety Car Heating & Lighting Co., Dixwell Avenue, Hamden, Conn., is completing plans for a new one-story building, 100 x 194 ft., for battery plate production, and a one-story addition to the present building, 106 x 115 ft. Stovel & Brinkerhoff, 136 Liberty Street, New York, are engineers and contractors.

A vocational department will be installed in the new junior high school to be erected at Somerville, Mass., estimated to cost about \$800,000, for which Ritchie, Parsons & Taylor, 15 Ashburton Place, Boston, are architects.

The Cumberland County Power & Light Co., Congress and Elm streets, Portland, Me., has foundations in progress for a new electric generating plant at South Portland, estimated to cost \$1,000,000, including machinery.

The Saco-Lowell Shops, 77 Franklin Street, Boston, manufacturers of textile machinery and parts, have plans under consideration for an addition to the plant at Lowell, Mass.

The New Bedford Gas & Edison Light Co., New Bedford, Mass., has arranged for a capital stock issue of \$1,602,720, a portion of the proceeds to be used for plant extensions and improvements.

## Cincinnati

CINCINNATI, July 17.

WHILE it was expected that July would be a quiet month in the machine tool industry, the number of orders booked the past week was a source of much satisfaction to local manufacturers. While no large purchases were made, single orders were well up to the average of the past few weeks. In addition to domestic business, an export order for six tools was booked and shipped from stock by a local manufacturer. An Indianapolis manufacturer bought five tools from a local firm and an Indiana automobile manufacturer also placed an order for six special machines for manufacturing parts. A Cincinnati manufacturer received a contract from a Pittsburgh district steel company for six lathes and was in receipt of an order from a printing press manufacturer in the East for a number of tools.

The Ford Motor Co. is in the market for a number of special machines and the Louisville & Nashville railroad also has an inquiry out for several tools.

Local manufacturers report a scarcity of good men and are forced to pay much higher wages than recently to secure enough mechanics to take care of orders.

Littleford Brothers, sheet metal workers, Cincinnati, have awarded the contract for a three-story office building and a two-story factory adjoining their present property on East Third Street. The building will be 45 ft. x 240 ft. of reinforced concrete. The Austin Co. of Cleveland, are the architects.

The Warner Elevator Co., Spring Grove Avenue, Cincinnati, has awarded the contract for an addition to contain approximately 38,000 sq. ft. of floor space. It will be used principally as an assembling floor.

The plant of the Louisville Cement Co., near Jeffersonville,

Ind., was damaged by fire to the extent of \$250,000 on July 13. About \$75,000 worth of machinery was destroyed. It is understood that the works will be rebuilt as soon as plans can be prepared.

The receiver's sale at the plant of the Allen Motor Car Co., Columbus and Bucyrus, Ohio, the past week brought approximately \$210,000. The real estate owned by the company at Columbus was not disposed of.

The Lowe Brothers Co., paint manufacturer, Dayton, Ohio, is having plans prepared for a 7-story addition at Wayne Avenue and the Baltimore & Ohio Railroad, of reinforced concrete, 60 x 270 ft. Frank Hill Smith, Inc., Dayton, Ohio, is the engineer.

## Milwaukee

MILWAUKEE, July 17.

THE machine-tool business so far in July has not differed materially from that in May or June, but it is encouraging to note that volume is slowly but steadily assuming broader proportions. Demand remains spotty and spasmodic and purchases still are confined to the most urgent needs. On the other hand, replacement requirements have enlarged and embrace needs for additional capacity. This is especially true of the automotive industries, which in general continue along the active lines developed in the last three to five months. Agricultural machinery manufacturers begin to feel a substantial revival which is believed to portend a resumption of equipment needs. Milling machine demand, while not normally active, is gradually increasing, making production schedules of local plants not only heavier but much more regular.

Prospects for the selection of Milwaukee as the location of a proposed American aircraft works by A. H. G. Fokker of Amsterdam and Rotterdam, Holland, appear bright as the result of a conference of 50 leading business men called by the Milwaukee Association of Commerce to consider a definite proposition on July 12. It is understood that commercial organizations in New York, Chicago, Dayton and Columbus, Ohio, are entertaining similar propositions. The prospective investment is \$3,000,000, of which amount the inventor and manufacturer proposes to furnish approximately 80 per cent. Francis A. Vaughn, president F. A. Vaughn, Inc., consulting engineer, 290 Third Street, is representing the Milwaukee interests.

The Scolding Locks Hair Pin Co., Appleton, Wis., manufacturer of hair pins and other wire specialties and novelties, has broken ground for a new factory, 40 x 200 ft., one story and part basement, at Appleton Junction. The present shop equipment will be augmented by miscellaneous purchases upon which inquiries are about to be put out. The total investment is estimated at \$75,000.

Frank Holton & Co., Elkhorn, Wis., manufacturers of band and orchestra instruments and metal music specialties, has let contract to Morrissey Brothers, local, for a two-story brick, concrete and mill-floored addition, 40 x 80 ft., which will cost about \$45,000, including additional equipment. This will include drawing, stamping, pressing, polishing, plating and other machinery. Harry J. Charlton is secretary and general manager.

J. H. Saris, Ford dealer, Beloit, Wis., has placed the complete contract with the W. G. Fitzgerald Co., 726 Central Avenue, local, for a new garage, sales and service establishment, 100 x 130 ft., two stories and basement, at 412 Broad Street. The machine shop department will occupy a space, 75 x 100 ft., and the building and equipment will cost about \$100,000. The architects are J. E. Hetherington & Son, 105 North Clark Street, Chicago.

The Republic Box Co., Chicago, has plans for a new box and crating factory to be erected at Marinette, Wis., in place of the plant almost totally destroyed by fire last fall. It will be of brick and steel, one story, 100 x 250 ft., with several wings and a separate power plant and boiler house. Commencement of the work has been delayed, but the recent substantial betterment in general business conditions is expected to bring a decision to start shortly. John Stunkel is secretary.

Gregor Lenz, Little Chute, Wis., dealer and repairer of automobiles, tractors, etc., will erect a one-story building, 60 x 120 ft., designed by A. A. Nelson, architect, Neenah, Wis. It will cost about \$20,000 complete.

The L. Niemcheck Mfg. Co., Milwaukee, has been incorporated with a capital stock of \$25,000 to manufacture tools, dies, jigs, fixtures, metal stampings, etc. It takes over the business of a similar character developed in recent years under the style of Niemcheck & Wenzel, at 313 Poplar Street, Milwaukee. Ludwig Niemcheck, E. Wiznerowicz and S. L. Grzechowiak are the principals in the new organization.

Milwaukee and Appleton interests, as yet unidentified, are negotiating for the lease or purchase of the plant of the Rex Foundry Co. at Schleisingsville, Wis., to remodel and equip it for the manufacture of steel castings by the electric furnace process. It is proposed to employ about 50 at the start. The commencement of operations is dependent upon how soon arrangements can be made for the supply of current from the Milwaukee Electric Railway & Light Co. At present only a tributary line supplies customers at Schleisingsville, which is inadequate for electric furnace requirements.

The Bahde Mfg. Co., 2616 Vilet Street, Milwaukee, has let the general contract to Paul Bringe & Co., 940 Third Street, for a one-story brick and concrete machine shop, 30 x 104 ft., at Thirtieth and Chambers streets. It will require new equipment throughout. As previously reported, it was recently incorporated to manufacture mechanical appliances on a royalty basis under contracts with inventors and designers. The initial investment will be about \$20,000.

The Herman Motor Car Co., Appleton, Wis., expects to start work shortly after Aug. 1 on a two-story brick and concrete garage and repair shop, 80 ft. square, one floor of which will be equipped for machine work. It will cost about \$25,000.

The Claybourn Process Corporation, Milwaukee, organized recently by L. W. Claybourn, Menasha, Wis., to manufacture automatic multicolor printing presses, has been granted permits for the erection of its manufacturing group at Humboldt Avenue, Franklin and Becker streets, plans for which have been prepared by Herman J. Esser, architect, 402 Camp Building, Milwaukee. The main building will be 122 x 124 ft., one story, of brick and steel; the power house, 30 x 50 ft., one story; the assembling, warehouse, storage, administration and general purpose building, 103 x 122 ft., two stories and basement. The cost of the structures is estimated at \$175,000. Machinery and equipment will cost in the neighborhood of \$125,000 to \$150,000 additional.

The Heating & Power Appliance Co., Milwaukee, organized some time ago by F. L. Hutchinson, has established a factory and machine shop at 200-210 Pleasant Street to manufacture a new type of valve for vacuum, vapor and atmospheric systems of heating. It also manufactures other heating and power appliances, steam and electric driven pumps, fire brick, etc., and does general heating and power engineering and contracting. Mr. Hutchinson is president; M. V. Elcholtz, vice-president, and W. M. Tuckwell, secretary and treasurer.

The Meyer Furnace & Supply Co., Milwaukee, has been incorporated with a capital stock of \$50,000 to manufacture furnaces, stoves, sheet metal specialties, etc. A factory has been opened at 170-174 Reed Street. The incorporators are F. W. Glese, Don Howland and H. L. Jackson.

The Northern Sash & Door Co., Hawkins, Wis., has recently increased its authorized capitalization to \$100,000 to provide for enlargement of the plant and the purchase of miscellaneous equipment.

## Pittsburgh

PITTSBURGH, July 17.

The National Metal Products Co., West Erie Street, Pittsburgh, is planning for a new three-story factory at West Erie and Diamond streets, to manufacture metal weatherstrips and other products, estimated to cost in excess of \$75,000.

The Pittsburgh Gage & Supply Co., Thirtieth and Liberty streets, Pittsburgh, manufacturer of electrically-operated washing machines, ironing machines, etc., is disposing of a bond issue of \$600,000, a portion of the proceeds to be used for extensions and additional working capital.

The Industrial Bureau of the Chamber of Commerce, Pittsburgh, is perfecting arrangements for the establishment of three new plants in the city, each of which will manufacture steel products. The company names are temporarily withheld. R. J. Seaman is head of the department in charge of the projects.

The Champion Tool Co., Meadville, Pa., is taking bids for a new one and two-story machine and forge shop, 100 x 200 ft., and 60 x 60 ft., respectively, estimated to cost in excess of \$60,000, including equipment.

The Coraopolis Electric Co., Coraopolis, Pa., is being organized under State laws, to equip and operate a local electric plant and system.

The Fayro Machine & Engineering Co., Johnstown, Pa., has acquired the plant and property of the Reinhold Betterman Co., manufacturer of boilers, tanks, etc., and will operate the works. The purchasing company is erecting a plant at Sheridan, Pa., and as soon as this is completed the Betterman plant will be discontinued and the machinery removed to the new building. F. F. Faunce is president and J. C. Ayres, vice-president and treasurer.

The Hopkins Motor Co., Fifteenth Street, Wheeling, W. Va., is taking bids for a new three-story service and repair works, 40 x 60 ft., at Eoff and Fifteenth streets, estimated to cost about \$50,000. E. B. Franzheim, 1425 Chapline Street, is architect.

A vocational department will be installed in the new two-story high school to be erected at Vendergrift, Pa., estimated to cost about \$155,000. W. G. Eckles, New Castle, Pa., is architect.

The Warren Auto Trading Co., Wheeling, W. Va., has plans in progress for a new three-story automobile service and repair works, 60 x 125 ft., estimated to cost about \$50,000.

The Harbison-Walker Refractories Co., Farmers' Bank Building, Pittsburgh, has awarded contract to Pihl & Miller, Walsh Building, for a new four-story building, 40 x 130 ft., estimated to cost about \$55,000.

The Standard Plate Glass Co., Butler, Pa., is laying foundations for a new one-story building, 100 x 250 ft., estimated to cost about \$100,000.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has awarded a general contract to the Austin Co., Euclid Avenue, Cleveland, for a one-story foundry and machine shop at New Brighton, Pa., estimated to cost about \$50,000.

The Fesenmeier Packing Co., Huntington, W. Va., has acquired property on Fourteenth Street and will remodel the structure for an ice-manufacturing and cold storage plant to have an initial output of 250 tons of ice per day and cold storage capacity for about 35,000 bbl. It is estimated to cost in excess of \$125,000, with equipment.

The Consolidated Light, Heat & Power Co., Miller-Ritter Building, Huntington, W. Va., plans the erection of a new two-story power house, estimated to cost close to \$100,000.

## Baltimore

BALTIMORE, July 17.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, will soon take bids for a new two-story power house at 6-8 McClellan Street, estimated to cost about \$35,000.

The Republic Boiler & Radiator Co., Woodbury, Baltimore, recently organized, will remodel a portion of the former ordnance plant of the Government, lately acquired, for the establishment of works to manufacture boilers, radiators and other heating equipment. New buildings will be constructed, providing a total floor area of 82,500 sq. ft., estimated to cost \$50,000. E. L. Stock is president.

The District of Columbia Paper Co., Water and Thirty-fourth streets, Washington, will build a new one-story hydroelectric power plant for mill service, estimated to cost close to \$60,000. G. L. Nichol森 is president.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Aug. 1 for the following equipment: Schedule, 56, two crank shapers; schedule 57, one upright drill, one grinding cutter and reamer, one arbor press, one twist drill grinder and one serpentine shear; schedule 58, three precision bench lathes, three engine lathes, and one toolmakers' lathe, all for the naval base at Bellevue, D. C.; also until Aug. 1 for the following equipment for Eastern and Western navy yards: Schedule 5645, 106 hand drills, 64 soldering irons, side-cutting pliers, 608 gasoline torches, 1950 pipe wrenches, 114 dozen files, and 9 chain blocks.

The Southern Power Co., Charlotte, N. C., has tentative plans for a new hydroelectric power plant on the Catawba River. It is proposed to construct a dam between Van Wyck and Great Falls, locating the plant in the vicinity of the first noted place.

The Union Machine Shop, Richmond, Va., will install a new lathe, grinder and other equipment. R. E. Savage heads the company.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until July 26 for coal and ash-handling machinery for the naval base at Hampton Roads, Va., as set forth under specification 4667.

The City Council, Valdosta, Ga., has tentative plans under way for a new electrically-operated pumping plant, to replace the station recently destroyed by fire with loss estimated at \$35,000.

The General Electric Co., Citizens' and Southern Bank Building, Atlanta, Ga., has plans under way for a new local distributing building, four stories reinforced-concrete, estimated to cost about \$175,000, including equipment. It is proposed to erect a one-story adjoining building as a machine and repair shop, and general service works. Headquarters of the company are at Schenectady, N. Y.

B. A. Easterling, Denmark, S. C., and associates, are organizing a company to build and operate a hydroelectric

power plant on the Edisto River. A site has been selected about four miles from the city. The new generating plant will be operated in conjunction with an existing steam-operated station at Denmark.

A vocational department will be installed in the new southwest junior high school to be erected at Gwynn's Fall Park, Baltimore, estimated to cost in excess of \$500,000. Smith & May, Calvert Building, are architects.

The Lavale Light & Power Co., Lavale, Md., recently organized, has acquired the local power plant of the Lavale Milling Co., now in receivership, and plans for immediate enlargement, to include the installation of new generating and other machinery. It is headed by M. S. Berkley and Ezra Deal, both of Lavale.

The office of the Chief of Engineers, United States Army, Washington, will take bids until Aug. 1, for 10 Diesel engine generating sets, each 90 kw., 125 volts and switchboards; also for four motor-driven air compressors.

The Sandhill Power Co., Carthage, N. C., is planning for the construction of a new steam-driven electric power plant in the vicinity of the property of the Carolina Coal Co., to be used as an auxiliary to the present hydroelectric power station. It is estimated to cost in excess of \$100,000. John R. McQueen is president.

The Board of Public Works, Baltimore, will build a one-story service and repair plant, 32 x 100 ft., at Cedar Avenue and Twenty-fourth Street, for automobiles and motorcycles used by the Police Department. A machine repair department will be provided. It will cost about \$25,000.

The Hackley Morrison Co., 16½ North Ninth Street, Richmond, Va., machinery dealer, is making inquiries for a number of electric generators, with exciters, base, switchboard, etc.

Electric motors, controlling devices, conveying machinery and other mechanical equipment will be installed in the new four-story printing plant, 90 x 140 ft., to be erected by the News-Leader Publishing Co., 9 North Eighth Street, Richmond, Va., estimated to cost about \$300,000. Baskerville & Lambert, Travelers' Building, architects, are taking bids.

## The Gulf States

BIRMINGHAM, July 17.

The United States Machine Shop, Box 424, Electra, Tex., recently organized, has acquired a local building and plans the installation of equipment for a forge and machine shop for the production of oil-well equipment and supplies. C. A. Lininger is secretary, treasurer and general manager.

The Texas Power & Light Co., Waco, Tex., is disposing of a bond issue of \$2,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. A. S. Grenier is vice-president.

The Consumers Light & Power Co., New Orleans, will commence the immediate erection of a new power plant.

The Standard Oil Co. of Louisiana, New Orleans, is perfecting plans for the installation of new pipe lines, pumping plants and auxiliary equipment, to provide for an additional handling capacity of 75,000 gallons of oil per day, estimated to cost close to \$5,000,000.

The Tucker Motor Co., Tuscaloosa, Ala., has leased a new building to be erected on Sixth Street, for the establishment of a service works, with machine repair shop. It is estimated to cost close to \$50,000.

The Florida Veneer & Crate Co., Brooksville, Fla., recently organized, has acquired a local building and will install machinery to manufacture crates, boxes, etc., estimated to cost about \$22,000. J. K. Coogler is treasurer in charge.

The Honey Creek Minerals Co., Llano, Tex., operating molybdenite ore properties, has plans under way for the erection of a new refinery and laboratory, estimated to cost about \$150,000, including machinery. It will also install a quantity of machinery at its local mines, to cost about \$100,000.

The Bristow Refining Co., Cross Plains, Tex., has foundation work under way for its new oil refinery to have an initial capacity of about 500 bbl. per day. It will cost close to \$100,000, including pipe line from the Pioneer oil fields.

The Consumers' Ice Co., Sulphur Springs, Fla., has plans in progress for a new branch ice-manufacturing plant at Nebraska Avenue and Broad Street, estimated to cost close to \$45,000, including equipment. Clyde Perry is general manager.

Stringer Brothers, Gadsden, Ala., manufacturers of pipe, plumbing specialties, etc., have filed plans for a one-story building, 60 x 100 ft., and adjoining extension, 40 x 40 ft.

A vocational department will be installed in the three-story high school to be built at Beaumont, Tex., by the South Park Independent School District, estimated to cost

about \$175,000. The R. H. Hunt Co., Dallas, Tex., is engineer and architect.

Price Brothers, Rotan, Tex., will build a new five-stand cotton ginning plant at Big Spring, Tex. A site has been acquired at East Second and Benton streets. C. E. Lytle is manager.

Ryan & Knight, Inc., Miami, Fla., will commence the immediate erection of a new three-story automobile service building, 90 x 110 ft., with machine shop and repair department, estimated to cost about \$90,000.

The Atlantic Coast Line Railway Co., Wilmington, N. C., has tentative plans for rebuilding the portion of its car and locomotive shops at Montgomery, Ala., including machine shops, car repair building, mill room and engine house, recently destroyed by fire with loss estimated at about \$200,000.

A vocational department will be installed in the new high school to be erected at Port Arthur, Tex., estimated to cost about \$200,000.

The Lee Lumber Co., Tioga, La., has plans nearing completion for rebuilding its sawmill, recently destroyed by fire with loss of about \$100,000. The new plant will have a daily capacity of about 70,000 sq. ft.

The City Council, Kaufman, Tex., has tentative plans under consideration for the construction of a municipal electric power plant, with local distributing system. Estimates of cost of equipment will be secured at once.

The Clayton Refining Co., Dallas, Tex., has work under way on remodeling and improving the refinery of the Hercules Refining Co., West Dallas, recently acquired. The work, including equipment, will cost close to \$50,000.

The Alabama Concrete Pipe & Mfg. Co., Birmingham, recently organized, has taken over the local plant of the Southern Bridge Co., for the production of concrete pipe specialties. J. C. Griffin is president, and W. C. Austin, secretary and treasurer.

## The Central South

ST. LOUIS, July 17.

The White Co., Firestone Building, Kansas City, Mo., manufacturer of motor trucks with plant at Cleveland, has awarded contract to the George M. Bliss Construction Co., 508 Lathrop Building, for a two-story and basement service and repair building, 100 x 250 ft., at Twenty-eighth and Walnut streets, estimated to cost about \$100,000. M. A. O'Mara is local manager.

The Service Machine Shop, Henryetta, Okla., has tentative plans for rebuilding the portion of its plant destroyed by fire July 6, with loss reported at \$20,000.

The Tulsa Stove & Foundry Co., San Springs, Okla., has awarded contract to the Tulsa Structural Steel Co., Tulsa, Okla., for a one-story addition, 80 x 290 ft., for the manufacture of oil field pumps, engines, parts, etc. It is estimated to cost about \$180,000, including equipment, which will include a number of traveling cranes and electrically-driven tools. A. C. Spitznagel is head.

Fire, July 5 destroyed the planing mill of J. C. Winn, Muskogee, Okla., with loss estimated at about \$45,000, including equipment. It is planned to rebuild.

The Constantin Refining Co., Tulsa, Okla., is disposing of a bond issue of \$720,000, a portion of the proceeds to be used for extensions and improvements.

The Wilhoit Refining Co., Joplin, Mo., is planning for extensions and improvements in its refinery, including the installation of new equipment, estimated to cost about \$75,000.

The Empire District Electric Co., Joplin, Mo., operated by the Cities Service Co., 60 Wall Street, New York, is planning for an addition to its generating plant, to include the installation of a 10,000 kw. generator and auxiliary machinery.

A vocational department will be installed in the new high school to be erected at Wichita, Kan., three stories and basement, estimated to cost about \$1,000,000, for which bids are being asked until July 31. Lorentz Schmidt & Co., 121 North Market Street, are architects.

The Oklahoma Public Service Co., Mayo Building, Tulsa, Okla., is perfecting plans for an addition to its electric generating plant, estimated to cost about \$1,000,000, including machinery. Sargent & Lundy, 72 West Adams Street, Chicago, are engineers.

The Goodwin-Fields Motor Car Co., 250 East Main Street, Lexington, Ky., will commence the immediate erection of a one-story and basement service and repair building, 100 x 200 ft., on Main Street, estimated to cost about \$60,000. The Frankel, Curtis Co., Ben Ali Theater Building, is architect.

The Arkansas-Missouri Power Co., Blytheville, Ark., has

been granted permission to issue bonds for \$652,000, a portion of the proceeds to be used for extensions and improvements in power plants and system. The company is concluding negotiations for the purchase of the property of the Missouri-Southeastern Utilities Co., and the Carthageville-Kennett Light & Power Co., and will make extensions in these plants.

The Osage Battery Co., Tulsa, Okla., has preliminary plans for the erection of a local factory, estimated to cost in excess of \$75,000.

The Joplin Supply Co., Joplin, Mo., has awarded contract to the C. A. Dieter Construction Co., Joplin, for a five-story and basement automobile service and repair works, 75 x 120 ft., estimated to cost about \$200,000, including equipment. Smith & Van Pelt, Frisco Building, are architects.

The Atchison, Topeka & Santa Fe Railroad, 80 East Jackson Boulevard, Chicago, will soon break ground for its new boiler and tank shops at Albuquerque, N. M., estimated to cost about \$500,000, including equipment.

A vocational department will be installed in the two-story and basement high school, 70 x 122 ft., to be erected at Kingfisher, Okla., estimated to cost close to \$100,000. Munnot & Reid, 409 Empire Building, Oklahoma City, Okla., are architects.

Eisele & Co., Nashville, Tenn., manufacturer of surgical instruments and similar equipment, have leased a local building for the establishment of a new plant. A list of equipment for installation is being arranged, to include automatic screw machines, hand-operated screw machines, punches, presses, etc., as well as a quantity of special machinery. An electro-plating department will be established. Logan Eisele is president.

The Apco Refining Co., Colecord Building, Oklahoma City, Okla., recently organized with a capital of \$100,000, has plans under way for a new oil refinery with initial output of about 750 bbl. per day. It will cost in excess of \$50,000.

## The Pacific Coast

SAN FRANCISCO, July 11.

Henry Olson, Seventeenth and Santee streets, Los Angeles, will soon commence the erection of a new one-story machine shop, 100 x 150 ft. A. G. Bailey, 3429 Lanfranco Street, is architect.

The Berkeley School District, Berkeley, Cal., will build a one-story machine and mechanical shop at the Burbank School, estimated to cost about \$20,000.

The Illinois Electric Co., Los Angeles, manufacturer of electrical specialties, is completing plans for a new four-story building, 50 x 137 ft., at Boyd and San Pedro streets, estimated to cost about \$65,000. Noerenberg & Johnson, 401 Los Angeles Railway Building, are architects.

The Shell Oil Co., 343 Sansome Street, San Francisco, has plans nearing completion for a new oil distributing plant at Yuba City, Cal., estimated to cost about \$35,000.

The San Joaquin Light & Power Corporation, Fresno, Cal., will build an addition, 48 x 110 ft., to its power house at California and Orange avenues, estimated to cost about \$100,000.

The Oil Tool Service Mfg. Co., Anaheim, Cal., has filed plans for the erection of a new one-story building to be equipped as a machine shop and foundry. It will cost about \$25,000. B. D. McAlvay is president.

The Central Mendocino County Power Co., Willits, Cal., has made application for permission to issue stock for \$200,000, the proceeds to be used for a new power plant and local distributing system.

Nathaniel Baldwin, Salt Lake City, Utah, operating a plant to manufacture wireless receivers and other radio specialties, has organized a company to be known as Nathaniel Baldwin, Inc., capitalized at \$1,000,000, to provide for general expansion in operations. It will enlarge its facilities for receiver and amplifier production. David Neff will be vice president and treasurer, and Lawrence Clayton, secretary.

The Board of Education, Los Angeles, will soon commence the erection of a new one-story shop building at the Jefferson High School, estimated to cost \$50,000.

The Western Iron-Its Sash Weight Co., Los Angeles, recently organized to manufacture sash weights, has established a plant at 2448 East Eleventh Street. In addition to regular iron sash weights, it will produce a concrete sash weight under rights granted by the Concrete Sash Weight Co. George W. Roberts and Alexander R. White head the company.

The Hubbard Machine Co., 615 Howard Street, San Francisco, manufacturer of pumping machinery, has leased a new building, one-story, 50 x 165 ft., now in course of erection, for a new works.

The Washington Iron Works, Seattle Boulevard and Nor-

man Street, Seattle, Wash., has plans nearing completion for the erection of the following buildings: Foundry, one-story, 130 x 450 ft., for the production of steel and grey iron castings; machine and erecting shop, one-story, 120 x 570 ft.; boiler and plate shop, one-story, 80 x 570 ft.; pattern shop, five stories, totaling about 50,000 sq. ft. of floor area; iron-working shop, one-story, 50 x 110 ft.; carpenter and wood-working shop, one-story, 50 x 100 ft.; store house, 60 x 200 ft.; power plant, 50 x 110 ft.; and three-story office. The structures will be of steel and concrete and are estimated to cost about \$500,000, including machinery. Richard E. Ellis is company engineer; Gerald Fink is president.

The Oregon Pulp & Paper Co., Salem, Ore., has plans nearing completion for additional machinery to increase the capacity about one-third. The expansion is estimated to cost about \$200,000.

The Foster Lumber Co., Dallas, Ore., is considering plans for rebuilding the portion of its mill recently destroyed by fire with loss estimated at about \$100,000, including machinery.

Fire, July 5, destroyed a large portion of the mill of the Murphy Timber Co., Portland, Ore., with loss estimated at about \$250,000. It was operated throughout with electric drive. It is proposed to rebuild at an early date. Edward Murphy is president.

## Canada

TORONTO, July 17.

ORDERS for one or two machines still continue to predominate in this market. Automotive plants are buying in a limited way for replacement purposes, but some good orders are expected from this source later, as a number of manufacturing plants are under construction for which equipment will be required. The Durant Motors, Ltd., Toronto, is about to start work on an addition for the manufacture of the Star car, the new building to be completed and in operation by next spring. Wood-working equipment is in fair demand and some good orders having recently been closed for the line. Inquiries from various parts of the Dominion are coming in for equipment for diversified lines of manufacture and dealers are of the opinion that if only a small portion of this prospective business results in actual sales the year will show a decided improvement over that of 1921. Dealers are experiencing a steady call for most lines of small tools and buyers are ordering in larger quantities. Prices are holding firm.

Wallace R. Campbell, vice-president and treasurer Ford Motor Co. of Canada, Ltd., has announced that his company will soon begin the erection of a large motor car plant immediately adjacent to the works at Ford City, Ont. It will cover approximately 125 acres and will cost in the neighborhood of \$6,000,000. For several weeks it has been known that big developments were to be looked for at Ford City, but official announcement was postponed until the real estate was actually secured. This has been purchased at a cost of approximately \$1,000,000 and definite plans for the works are being prepared. It is expected that the production of the Canadian Ford will be doubled immediately the new plant is in operation and the plans are to turn out 500 cars a day. This, however, will not represent the entire capacity, as the plans will allow a production of 1000 cars per day as soon as the market warrants the output. The new property extends for 2000 ft. along the river front. The buildings will all be one story, with daylight roofs. The present plant will gradually cease to operate as a motor car factory, following the completion of the new buildings, and will eventually be devoted to the manufacture of car bodies, a line of manufacture not now carried on by the Ford company here.

The Windsor Steam Motors, a branch of the Trask Detroit Steamer Co., is arranging for the erection of a manufacturing plant at Windsor, Ont. Until the Windsor plant is ready for operation it is the intention of the company to take care of the Canadian trade from the Detroit plant.

The Charles A. Strelinger Co., Windsor, Ont., has secured one-half of the contract for machine tools let by the Sarnia Board of Education for the new technical school and college institute. The order consists of five lathes, two gas burners, one electric furnace, torch-weld equipment, grinder and anvil.

The Toronto Board of Control has awarded contract for a 4,000,000-gal. centrifugal pump for the Island pumping station to the John Inglis Co., Strachan Avenue, Toronto, whose price was some \$300 lower than that of the lowest United States bidder.

The Peninsula Cord Tire Co., 45 John Street South,

Hamilton, Ont., is arranging for the erection of a local manufacturing plant.

The general contract for a paper mill for the Westminster Paper Mills, Ltd., New Westminster, B. C., has been awarded to the Dominion Construction Co., 509 Richards Street, Vancouver, B. C.

The Ideal Iron Works, 123 Powell Street, Vancouver, B. C., will build a machine shop and has awarded the general contract to the James Layfield Contracting Co., 2763 Cambridge Street, Vancouver.

The towns of Enderby, B. C., will build an electric light plant to cost \$23,000, for which bids will soon be called.

The Durant Motors of Canada, Ltd., Royal Bank Building, Toronto, will receive bids, no closing date set, for an addition to its plant at Leaside, Ont., to cost \$500,000. Plans are with E. A. Walberg, 909 Royal Bank Building, Toronto.

## Indiana

INDIANAPOLIS, July 17.

Bids are being asked by the Board of School Trustees, Fort Wayne, Ind., until July 24, for the erection of a new vocational training school, plans and specifications for which have been prepared by the Austin Co., 208 South LaSalle Street, Chicago. Bids for machinery and equipment will be asked in the near future. Henry J. Bowerfind is secretary of the board.

The Olin-Wilmeth Co., Inc., 515 North Meridian Street, Indianapolis, formerly known as the Olin Sales Co., will commence the erection of a new three-story automobile service and repair building, 59 x 195 ft., at 720-22 North Meridian Street, estimated to cost about \$150,000. Roy F. Wilmeth is secretary and treasurer.

A power plant will be erected in connection with the new State reformatory to be built at Pendleton, Ind., at a cost of about \$3,000,000. Plans are being completed by Herbert Foltz, Indianapolis, architect for the Special Reformatory Committee, State House, Indianapolis.

The Hercules Corporation, Evansville, Ind., has discontinued the manufacture of automobiles and parts, and subsidiaries of the company devoted to this line have been dissolved, including the Hercules Tractor Co., Hercules Body Mfg. Co., Hercules Wheel Co., Hercules Buggy Co. and the Hercules Engine Co.

William S. Baerich, Evansville, Ind., and associates, have acquired the uncompleted plant of the Stronghold Tire & Rubber Co. from the receiver. The new owner is said to be planning the organization of a new company to complete the erection, install machinery and operate the plant.

The Merchants Light, Heat & Power Co., Indianapolis, has leased a one-story building, 60 x 160 ft., at 305 North Senate Avenue, for a service and repair works for company trucks and cars.

The City Council, Michigan City, Ind., has tentative plans under way for rebuilding the pumping plant at the waterworks, destroyed by fire July 6, with loss estimated at close to \$500,000, including machinery.

The Acme Works, Inc., 420 South Harding Street, Indianapolis, manufacturer of castings, etc., is planning for the installation of new equipment, including metal and wood pattern-making apparatus. Peter Lambertous is president.

A vocational department will be installed in the new two-story and basement high school at Martinsville, Ind. D. A. Bohlen & Son, 1001 Majestic Building, Indianapolis, are architects.

Fire at the plant of the Louisville Cement Co., Speeds, Ind., July 13, caused a loss estimated at \$300,000, principally to the building manufacturing brickment and containing considerable machinery. A boiler-house supplying power was included in the loss. The entire plant of the company is valued at \$2,000,000.

## Lackawanna Steel Deficit Reduced

In the quarterly report of the Lackawanna Steel Co., which covers the three months ending with June, giving a comparative statement of the income account over the same period last year, a deficit of \$172,880 is shown against \$983,127, the second quarter deficit for 1921. Total net earnings of all properties after deducting taxes and other expenses were \$457,303, against a net loss a year ago of \$384,762.

For the first six months there was a deficit of \$652,852, as against \$974,392 for the first half of 1921. Net earnings over this period, before deducting charges, totaled \$659,713, whereas last year they reached only \$282,933. Interest charges for this period were \$528,742, compared with \$518,929 for 1921. Depreciation and accruing renewals amounted to \$783,823, compared with \$738,396.

## American Car & Foundry Report

The American Car & Foundry Co. in its report for the fiscal year ended April 30, 1922, shows surplus of \$4,483,320 after charges, federal taxes and preferred dividends equal to \$14.94 a share earned on the \$30,000,000 common stock. This compares with surplus of \$6,450,856, or \$21.50 a share in the previous year.

W. H. Woodin, president, says:

"The company began its year with thoroughly liquidated inventory of slightly over \$14,000,000—less than was needed for the business then on books. During the year orders for new equipment have come fitfully rather than in a steady flow. The market, in the main, has been a 'buyers' market,' and the railroads have been able to get their requirements at prices which have made possible a profit to the manufacturer only by the combination of a high degree of efficiency in production with the utmost economy in operation and material-purchases. The company closed its year with an inventory of less than \$10,000,000 and with a volume of new business on its books substantially in excess of that with which the year began.

"The railroads are slowly recovering from war-time conditions and effects of governmental control and operation. Rates they may charge for their service and wages they shall pay for labor are questions still in process of solution. Until these two great questions are settled, obviously the roads can with safety do no more than attempt to meet their immediate and absolute necessities in the rehabilitation of their properties. That they are lacking the facilities of transportation necessary for their requirements and for the proper handling of the country's traffic when industry and commerce shall return to normal conditions, cannot be doubted.

"The situation with respect to foreign business is not different in any marked degree from that of a year ago. While the company during the year has sold some equipment to other than domestic buyers, the management has not felt that conditions with respect to foreign credits have been such as to warrant the company in contracting for the sale of its products abroad unless payment were definitely and amply assured.

"Condition of the company is in all ways healthy and satisfactory. It has not been necessary during the year to draw to any appreciable extent upon any of the reserves.

"The company is fortunate in having a wide diversity of product which enables it to do a large and generally profitable business in the sale of miscellaneous articles and supplies."

## Industrial Finances

The recent increase in the capital stock of the Doehler Die-Casting Co., Brooklyn, was for the purpose of possible future requirements rather than for any additions in the immediate future.

Pittsburgh Steel Co. has declared the usual quarterly dividend of \$1.75 on the preferred stock, payable Sept. 1.

Elmer E. Mitchell, Wilmington, Del., has been appointed ancillary receiver of the Premier Motor Corporation, Indianapolis, the concern being a Delaware corporation. The petitioner is the American Foundry Co., Indianapolis, one of the creditors. The Fletcher Savings and Trust Co., Indianapolis, is receiver for the Premier Corporation, the foundry company being also petitioner there. The suits are friendly and in behalf of a reorganization of the corporation.

The Superior Court at Indianapolis has approved the sale of the Midwest Engine Co., of Indiana, that city, to the reorganization committee for a price said to be in excess of \$2,000,000. The bid on which the sale was made was by Benjamin F. Castle, New York, secretary pro tem. for the reorganization committee, of which the members are: Lewis E. Pierson and L. C. Ansmann, Cincinnati; Charles F. Mills, Boston, and Elmer W. Stout and Homer McKee, Indianapolis. The reorganized company will be known as the Midwest Engine Corporation.

Listing of stock of the Brier Hill Steel Co., Youngstown, Ohio, and the Trumbull Steel Co., Warren, Ohio, on the New York stock exchange is being given consideration by important interests in both companies.

Boston and Chicago banking interests have purchased and resold an issue of \$5,000,000 Crane Co., Chicago, 7 per cent cumulative preferred stock. Funds derived from the sale of this stock will be used largely as additional working capital.

Boston heavy hardware jobbing interests have been notified that the Champion Horseshoe Co., Pawtucket, R. I., has been acquired by the Phoenix Horse Shoe Co., Poughkeepsie, but is being operated under its old name. Further details are lacking.

## Trade Changes

Joseph W. Jones, manufacturer of electric drills, gages, etc., has arranged with C. K. Turner & Son, 116 Broad Street, to act as his representative in the foreign market.

The Mesta Machine Co., Pittsburgh, announces the removal of its Chicago office from the McCormick Building to the Peoples' Gas Building. C. J. Mesta, second vice-president, who has been in charge of the Chicago office for over a year, has returned to the home office in Pittsburgh to take charge of the sales department. A. B. Neumann, mechanical engineer, has been appointed manager of the Chicago office. Mr. Neumann has been in the Chicago district for a number of years in the capacity of chief engineer and consulting engineer for several of the largest steel plants in that district.

A. C. Haberkorn, former Detroit branch manager, Manning Maxwell & Moore, Inc. and Biggs-Watterson Co., and E. E. Wood, former sales manager Jones & Lamson Machine Co., have formed a partnership under the name of Haberkorn & Wood, and have opened an office and warehouse at 629 E. Hancock Ave., intending to handle a line of machine tools, cutting oils and compounds, also permanent mould aluminum alloy castings.

E. V. Swangren, former vice-president and superintendent F. J. Littell Machine Co., Chicago, and W. N. Stevenson, former secretary and chief engineer of the same company, announce the formation of a partnership. The firm will be known as the S & S Machine Works, 4522 Lexington Street, Chicago.

Edward C. Dilworth, until recently manager of sales Pittsburgh-Des Moines Steel Co., Pittsburgh, who also had a broad experience in the structural steel business while affiliated with the American Bridge Co., has opened offices at 302 Wabash building, Pittsburgh, as a consulting engineer on all kinds of structural projects.

An arrangement has been consummated between The Bastian Blessing Co., Chicago, manufacturer of Rego welding and cutting apparatus and the St. Paul Welding & Mfg. Co., manufacturer of the Torit welding and cutting equipment by which the Bastian Blessing Co. has taken over the entire stock of the St. Paul Welding & Mfg. Co.'s line of soldering equipment, trucks, preheaters and acetylene generators. The latter company on the other hand, will be the service distributor of Rego welding and cutting equipment throughout the Northwest. It will carry a complete stock of welding and cutting equipment and supplies and operate a repair service station at St. Paul, Minn.

The Barnes Foundry Co. announces the removal of its main office and sales room to 515 West 56th Street, New York. The foundry and machine shop are located at Freeland, Pa.

The Westinghouse Electric & Mfg. Co. has opened a new office in Richmond, Va., in room 503, Virginia Railway & Power Co. building, with W. O. Peale in charge.

H. S. Huncke, western sales manager Lumen Bearing Co., Buffalo, N. Y., at Chicago, has resigned and formed the firm H. S. Huncke & Co., with headquarters at 15 North Jefferson Street, Chicago, to deal in wrenches, pliers, portable drills, screw plates, taps, dies, portable bench hack saw machines and welded steel shop equipment.

## Plans of New Companies

The McLaughlin Radio & Electrical Corporation, Equitable Building, Baltimore, recently incorporated, will have its work done by contract for the present. The company is, however, looking toward the erection and equipment of a thoroughly modern plant.

The Wireless Mfg. Co., Canton, Ohio, recently incorporated, will conduct principally a distributors' business, handling other manufacturers' products in a wholesale way, but it will market certain items of its own manufacture, at present principally transmitting inductances and a complete line of variable condensers to be put out under the trade name of Wimco.

The Furnace Fan Corporation, Dowagiac, Mich., will manufacture a small mechanical fan system called a furnace fan. The company contemplates taking over a plant now in Dowagiac, which has a complete foundry and machine shop equipment and will manufacture the entire unit in its plant.

The Aluminum Die-Casting Corporation has moved from 87 Thirty-fifth Street, Brooklyn, to Garwood, N. J.

## NEW TRADE PUBLICATIONS

**Amperehour Meters.**—Sangamo Electric Co., Springfield, Ill. Bulletin No. 58 describes the Sangamo "locomotive type" amperehour meter, which when installed permanently in the storage battery circuit on a truck, tractor or mine locomotive, registers every amperehour which the battery discharges in driving the vehicle. Since the total battery capacity is indicated by a red "empty" hand on the meter, the black hand indicates the remaining capacity left in the battery. When the battery is subsequently put on charge, the amperehour meter registers as the charge proceeds, operating in the reverse direction from that of the discharge. The booklet describes the principles of operation, and is illustrated with photographic reproductions and drawings.

**Oil Control Pump.**—The Oilgear Co., 60 Twenty-seventh Street, Milwaukee. Bulletin No. 6 describes the Oilgear control pump, designed to pump oil under pressure with instantly variable delivery from zero to maximum in either direction. A single operating handle controls the machine, giving desired rates of delivery, and stopping or reversing the flow. It can be connected to any machine or device requiring oil under pressure.

**Motor Generator Sets.**—Ideal Electric & Mfg. Co., Mansfield, Ohio. Bulletin No. 106 illustrates and describes the company's line of motor generator sets, giving names of some of the prominent users of this equipment.

**Electro-Plating Apparatus.**—Ideal Electric & Mfg. Co., Mansfield, Ohio. Bulletin No. 107 describes the company's line of electro-plating apparatus, which ranges from 50 to 7500 amperes.

**Pyrometers.**—Wilson-Maeulen Co., Inc., New York. Catalog No. 14, 20 pages. Illustrated description of the various instruments and recorders.

**Ferroalloys and Metals.**—A 26-page pamphlet giving the composition and uses of about 28 products of the "Electromet Brand" of ferroalloys and special alloys and metals put on the market by the Electro Metallurgical Co., 30 East Forty-second Street, New York.

**Carbon Dioxide Recorders.**—Uehling Instrument Co., Paterson, N. J. Bulletin 112, 12 pages, 6 by 9 in. Describes and illustrates single, two, three and four unit CO<sub>2</sub> meters and also a multiple unit which is for the office of the chief engineer, providing the means for measuring CO<sub>2</sub> from two to six boilers, independently and simultaneously. Type M gages operating on the hydrostatic principle are described and also type Z auxiliary boiler front indicator. The "Pyro-porus" filter for keeping the gas sampling lines clean is given space.

**Boiler Installations for Textile Mills.**—A 32-page heavily illustrated booklet issued by the Heine Boiler Co., St. Louis, devoted largely to illustrations of installations. Technical matters are handled, particularly the relation between boiler efficiency and flue gas temperature for different percentages of CO<sub>2</sub>. A table is given of the properties and calorific values of fuels drawn from many localities all over the United States.

**The Weather Vein.**—A 32-page pamphlet issued by the Carrier Engineering Corporation, Newark, N. J. This is devoted to the question of humidity in the air in manufacturing and other buildings and means by which that humidity may be controlled.

**Forty Years of Progress.**—An eight-page leaflet announcing the change of name of the Heine Safety Boiler Co. to the Heine Boiler Co., St. Louis. The boiler was first called a safety boiler because, being of the watertube type, there was only a small volume of high temperature water in it, thus minimizing the danger of explosions.

**Micarta Gears.**—Westinghouse Electric & Mfg. Co., East Pittsburgh. Circular 1579-B, containing general and technical data on Micarta, a non-metallic material for gear and pinion application, developed by the Westinghouse company. It is a laminated product of specially treated woven fabric of homogeneous structure and physical properties are claimed for it that make possible its substitution for untreated steel, cast iron, bronze and other materials used in gear manufacture. It is self-sustaining and may be machined with ordinary standard tools and equipment. It was developed primarily to provide a silent gear drive.

**Vises.**—Athol Machine & Foundry Co., Athol, Mass. A 48-page booklet, recently published by this company illustrates and gives specifications of their various types of vises, as well as grindstone frames and bench grinders.

**Steel Wheels and Derricks.**—Marion Machine, Foundry

& Supply Co., Marion, Ind. Bulletins 530 and 535, devoted to steel turnbuckle derricks and steel band wheels. Parts of the derricks are shown and line drawings give measurements and proportions. The steel band wheels and steel tug rims are described briefly in bulletin 535.

**Foundry and Pattern Shop Supplies.**—The Kindt-Collins Co., Cleveland. Catalog F, listing and illustrating pattern shop supplies and equipment, chaplets and snap flasks. Included are also crucible furnace blowers, blow torches and pattern shop woodworking machinery.

**Valves.**—Buckeye Iron & Brass Works, Dayton, Ohio. Catalogue of 159 pages, bound in cloth. This is the utilitarian type of book, of convenience to the purchasing agent and to the engineering or designing department, profusely illustrated with the types of valves and incidental specialties made by the company in both brass and iron and accompanied where necessary with sectional drawings. A noteworthy feature is an index for finding the particulars of valves by figure number. The brass section covers over 100 pages and illustrates valves under fifteen general classifications. Most of the remainder of the book is given over to the iron body valves, of which there are fourteen different general types, including blow-off valves and butterfly, throttle, safety and whistle valves. A few pages show the Government valves the company is prepared to make and fourteen or fifteen pages are devoted to data and information, such as the proportionate weight of castings to wood patterns, the shrinkage of patterns for different metal castings and tap drill sizes for threads.

**Hoevel Sandblast Machines.**—Hoevel Mfg. Corporation, Jersey City, N. J., 1922 catalog, 24 pages, describing and illustrating sand blasting machines and equipment, covering Hoevel revolving barrel, rotary table, cabinet, room and portable types.

**Preparing Flue for Analysis.**—Four-page illustrated leaflet by the Uehling Instrument Co., Paterson, N. J., patentee and manufacturer of the Pyro-porus gas filter, describes apparatus for excluding dust and dirt from gas sampling line.

**Heat Treatment Furnaces.**—Bulletin 242, W. S. Rockwell Co., 50 Church Street, New York, 16 pages, 8½ x 11 in., illustrates and describes the practical application of many types of heat treating furnaces. The bulletin includes also a discussion on the influence of method of heating and handling on quality and cost of heat treated products. There are 30 illustrations, mostly halftones.

**Pioneer Acid-Resisting Alloys.**—Pioneer Alloy Products Co., Inc., Cleveland—a 6-page leaflet giving the physical properties of Pioneer acid-resisting alloy and showing its use in an acid-resisting, quick-opening gate valve.

**Low Pressure Air Gas Inspirator.**—One of a series of bulletins published by the Surface Combustion Co., industrial furnaces, New York. Others are oven-furnaces, pot-hardening furnaces, soft metal furnaces, galvanizing baths, shipyard furnaces, rivet heaters, small forges and laboratory furnaces for high temperatures.

**Industrial Lighting Briefs.**—Cooper Hewitt Electric Co., Hoboken, N. J.—A series of bulletins containing digests and reviews of articles on the theory and practice of industrial lighting. Additional numbers to be published from time to time will deal with important phases of the subject in such a way that engineers interested in industrial lighting will be able to use them to advantage.

**Coal Pulverizer.**—Bannot Co., Canton, Ohio. A 12-page illustrated bulletin, 8 in. x 11 in., showing the uses, design and construction of the Bannot pulverizer, air separator and exhauster for powdered coal burning installations.

**Heating Specialties.**—Fulton Co., Knoxville, Tenn. Catalog No. 100, 144 pages, 3¼ in. x 6¼ in., illustrates and describes syphon heating devices and thermostatic equipment manufactured by the company, there being in addition 26 pages of tabular matter relating to properties of steam, relative humidity, specific heats, pressure equivalents, temperature conversion, pipe dimensions, etc.

**Positive Pressure Blowers.**—Connersville Blower Co., Connersville, Ind. Bulletin No. 21, 4 pages, 8½ in. x 11 in. Illustrates and describes the Victor line of small blowers (capacities 40 to 275 cu. ft. of free air per min. at pressures of 1 to 5 lb.).

**Malleable Nickel.**—American Nickel Corporation, Clearfield, Pa. A 12-page bulletin, 8½ in. x 11 in., giving a resumé of the properties and uses of pure nickel, shown by graphs and tabular comparisons.

**For Hoist Efficiency.**—The Wright Mfg. Co., Lisbon, Ohio. A 16-page illustrated booklet, two colors, giving capacities, details and prices of Wright hoists.

# Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

## Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined iron bars, base price.....	2.58c.
Swedish bars, base price.....	7.00c.
Soft steel bars, base price.....	2.58c.
Hoops, base price.....	3.63c.
Bands, base price.....	3.23c.
Beams and channels, angles and tees	
3 in. x ¼ in. and larger, base.....	2.68c.
Channels, angles and tees under 3 in. x ¼ in., base.....	2.58c.

## Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger.....	2.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)...	2.80c.
Toe-calk, ½ x ¾ in. and larger.....	3.40c.
Cold-rolled strip, soft and quarter hard..	6.25c. to 7.25c.
Open-hearth spring steel.....	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds.....	3.35c.
Squares, flats and hex.....	3.85c.
Standard cast steel, base price.....	12.00c.
Extra cast steel.....	17.00c.
Special cast steel.....	22.00c.

## Tank Plates—Steel

¾ in. and heavier.....	2.68c.
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## Sheets

### Blue Annealed

	Per Lb.
No. 10.....	3.63c.
No. 12.....	3.68c.
No. 14.....	3.73c.
No. 16.....	3.83c.

### Box Annealed—Black

	Soft Steel	Blued Stove
	C. R., One Pass, Per Lb.	Pipe Sheet, Per Lb.
Nos. 18 to 20.....	4.00c. to 4.30c.	.....
Nos. 22 and 24.....	4.05c. to 4.35c.	4.60c.
No. 26.....	4.10c. to 4.40c.	4.65c.
No. 28.....	4.20c. to 4.50c.	4.75c.
No. 30.....	4.45c. to 4.75c.	.....
No. 28 and lighter, 36 in. wide, 10c. higher.		

## Galvanized

	Per Lb.
No. 14.....	4.30c. to 4.60c.
No. 16.....	4.45c. to 4.75c.
Nos. 18 and 20.....	4.60c. to 4.90c.
Nos. 22 and 24.....	4.75c. to 5.05c.
No. 26.....	4.90c. to 5.20c.
No. 27.....	5.05c. to 5.35c.
No. 28.....	5.20c. to 5.50c.
No. 30.....	5.70c. to 6.00c.
No. 28 and lighter, 36 in. wide, 20c. higher.	

## Welded Pipe

### Standard Steel

	Black	Galv.
½ in. Butt..	—56	—40
¾ in. Butt..	—61	—47
1-3 in. Butt..	—63	—49
3½-6 in. Lap..	—60	—46
7-8 in. Lap..	—56	—34
9-12 in. Lap..	—55	—33

### Wrought Iron

	Black	Galv.
¾ in. Butt..	—30	—13
1½ in. Butt..	—32	—15
2 in. Lap....	—27	—10
2½-6 in. Lap..	—30	—15
7-12 in. Lap..	—23	—7

## Steel Wire

BASE PRICE\* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic.....	3.50c. to 3.75c.
Annealed soft.....	3.50c. to 3.75c.
Galvanized annealed.....	4.25c. to 4.50c.
Coppered basic.....	4.00c. to 4.25c.
Tinned soft Bessemer.....	5.50c. to 5.75c.

\*Regular extras for lighter gage.

## Brass Sheet, Rod, Tube and Wire

### BASE PRICE

High brass sheet.....	17¼c. to 18 c.
High brass wire.....	18¼c. to 18½c.
Brass rod.....	15¼c. to 16¼c.
Brass tube, brazed.....	24¼c. to 25 c.
Brass tube, seamless.....	20½c. to 21 c.
Copper tube, seamless.....	22¼c. to 24 c.

## Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¼c. to 22¼c. per lb. base.	
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.	

## Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14-20	Primes	Wasters
			80 lb..	\$6.05	\$5.80
			90 lb..	6.15	5.90
			100 lb..	6.25	6.00
	IC..	\$10.00		6.40	6.15
	IX..	11.50		7.40	7.15
	IXX..	13.00		8.40	8.15
	IXXX..	14.25		9.40	9.15
	IXXXX..	16.00		10.40	10.15

## Terne Plates

8-lb. coating, 14 x 20

100 lb. ....	\$7.00
IC.....	7.25
IX.....	7.50
Fire door stock.....	9.00

## Tin

Straits, pig.....	33¼c.
Bar.....	40c. to 44c.

## Copper

Lake ingot.....	15¼c.
Electrolytic.....	15 c.
Casting.....	14¼c.

## Spelter and Sheet Zinc

Western spelter.....	7c. to 7½c.
Sheet zinc, No. 9 base, casks.....	8½c. open 9c.

## Lead and Solder\*

American pig lead.....	6¾c. to 7c.
Bar lead.....	8c. to 8¼c.
Solder, ½ and ½ guaranteed.....	25c.
No. 1 solder.....	23¼c.
Refined solder.....	20¼c.

\*Prices of solder indicated by private brand vary according to composition.

## Babbitt Metal

Best grade, per lb.....	75c.
Commercial grade, per lb.....	35c.
Grade D, per lb.....	25c.

## Antimony

Asiatic.....	6½c. to 7c.
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## Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....	25c. to 27c.
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## Old Metals

Dealers report business improved this week with values firm. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible.....	11.75
Copper, heavy wire.....	11.25
Copper, light and bottoms.....	9.00
Brass, heavy.....	6.25
Brass, light.....	5.25
Heavy machine composition.....	8.50
No. 1 yellow brass turnings.....	6.50
No. 1 red brass or composition turnings.....	7.75
Lead, heavy.....	4.50
Lead, tea.....	3.25
Zinc.....	3.00

